AQWA™-TETHER MANUAL

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Revision Information

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CHAPTER 1 - TETHER ENHANCEMENT FOR THE AQWA SUITE

1. INTRODUCTION

This document describes the special enhancement to the AQWA suite of programs developed by Century Dynamics Limited for the analysis of tethers.

It is an addendum to the AQWA-DRIFT and AQWA-NAUT User Manuals and the AQWA Reference Manual, and must be used in conjunction with these manuals. A general knowledge of the AQWA suite is assumed.

CHAPTER 2 - DESCRIPTION OF TETHER ENHANCEMENT TO AQWA-NAUT AND AQWA-DRIFT

This enhancement enables the time history simulation of tethers during tow-out or when installed in regular and irregular waves. Motions, bending moments and stress are calculated during the simulation. For irregular waves, statistics of mean, significant and peak stresses are calculated for towed tethers and fatigue calculations by the rainflow method are also calculated.

Tethers are considered by AQWA as flexible tubes whose diameters are small compared to the wavelength. There are two special enhancements to AQWA-DRIFT and AQWA-NAUT for the analysis of tethers. The first enhancement is for **installed tethers**. Installed tethers may go slack and impact during operation. The second enhancement is for a single **towed tether**. Both are classified as a special types of mooring.

The equations of motion are solved for bending and lateral motion only, i.e. omitting translation and rotation in the axial direction.

The tether is described by a series of elements along the tether. The junctions of the elements are called nodes. Each element may have different geometric and material properties.

Before the main analysis, an eigenvalue analysis is optionally performed, which will describe the natural frequencies and mode shapes.

Time histories of displacements, bending moments and stresses are output, both on the printer file and on backing file, for post-processing with AQWA-PLANE. For AQWA-DRIFT, a statistical analysis and fatigue analysis for towed tethers is performed and output to the printer file.

Section 4 describes the major limitations of the program and analysis methods used.

The AQWA-TETHER program includes post-processing described below. AQWA-PLANE allows graphics to be plotted and creates HPGL or Postscript format files for hard copy.

2.1 PRINTED/TABULATED OUTPUT

Statistics (comprising mean value, 2 x rms., mean of 1/3 highest +ve and -ve peaks, 3 maximum and minimum peaks) for all of the following:

- position, velocity and acceleration of each node along the tether for all degrees of freedom (Y,Z,RY,RZ) for towed tethers and (X,Y,RX,RY) for installed tethers
- bending moments (MY and MZ), bending stress (Y and Z) and worst position bending stress at all nodes along the tether for towed tethers; effective tension, wall tension, shear force, maximum and minimum bending and axial stress, maximum von Mises stress and Y bending stress for installed tethers

The following applies to towed tethers only:

- post-processing of stress time histories, using the rainflow counting method to determine the position of worst fatigue damage at each node along the tether
- probability distribution of the stress range
- summary table of stresses along tether

2.2 GRAPHICAL OUTPUT - TOWED TETHERS

Plots of the following along the towed tether length at each timestep:

- position (Y,Z,RY,RZ)
- velocity (Y,Z,RY,RZ)
- acceleration (Y,Z,RY,RZ)
- MY and MZ bending moments and maximum moment
- maximum stress around the tether
- Y and Z bending stress
- stress at circumference position with maximum RMS stress

Up to 20 of the above may be overplotted on one graph to form an envelope.

Time history plots of the above at all positions along the tether.

2.3 GRAPHICAL OUTPUT - INSTALLED TETHERS

Plots of the following along the installed tether at each timestep:

- position (X,Y,RX,RY)
- velocity (X,Y,RX,RY)
- acceleration (X,Y,RX,RY)
- effective tension
- wall tension
- shear tension
- maximum axial and bending stress
- minimum axial and bending stress
- maximum von Mises stress
- Y bending stress

Time history plots of the above at all positions along the tether.

CHAPTER 3 - THEORETICAL FORMULATION FOR TETHERS

3.1 EQUATION OF MOTION

The dynamic axial motion (i.e. rotation and translation) of tethers is not considered in the analysis. The axial rotation is ignored and the translation treated as static. Hence the displacements of the tether are 2 translations and 2 rotations at each node. The equation of motion for each element of the tether therefore has 8 degrees of freedom, i.e.

$$(Ms+Ma)\,(A) = (Ft)$$

where

Ms	=	structural mass matrix (8*8)
Ma	=	added mass matrix (see below) (8*8)
A	=	acceleration vector, 4 at each end (8*1)
Ft	=	total applied forces vector, 4 at each end (8*1)

3.2 STRUCTURAL AND ADDED MASS MATRICES

As the displacements along the tether are rotations and translations at each node, the displacement of the tether is defined by a cubic function. Hence, the structural mass matrix for each element of the tether is defined by a 8*8 matrix as follows:

$$Ms = \frac{ms}{420}$$

156L			$22L^2$	54L			$-13L^2$
	156L	$-22L^2$			54L	$13L^2$	
	$-22L^2$	$4L^3$			$-13L^2$	$-3L^3$	
$22L^2$			$4L^3$	$13L^2$			$-3L^3$
54L			$13L^2$	156L			$-22L^2$
	54L	$-13L^2$			156L	$22L^2$	
	$13L^2$	$-3L^3$			$22L^2$	$4L^3$	
$-13L^2$			$-3L^3$	$-22L^2$			$4L^3$

where

ms = structural mass per unit length
L = length of the element

The added mass for completely submerged tethers will be the same as above, where the mass per unit length will be the displaced mass per unit length. This is assumed to be the case for installed tethers.

For each part of the element in the water (the element is split into smaller lengths for accuracy, see Section 3.4) the added mass is calculated by integrating the following function along each length by Gauss quadrature:

$$Ma = \int_{L1}^{L2} T \; ma \; T^t . dx$$

where

T = 8*2 transfer function matrix, which may be considered as the forces and moments at the ends of an encastre beam, caused by unit load at a position 'a', where a is the proportion along the length of total element length L, i.e.

$$T=\begin{vmatrix} 1-a^2(3-2a) & 0 \\ 0 & 1-a^2(3-2a) \\ 0 & -La(1-a^2) \\ La(1-a^2) & 0 \\ a^2(3-2a) & 0 \\ 0 & a^2(3-2a) \\ 0 & -La^2(1-a) \\ La^2(1-a) & 0 \end{vmatrix}$$

ma = a diagonal 2*2 matrix of mass per unit length, which depends on the level of submersion of the tether, i.e.

$$ma=\begin{vmatrix} my & 0 \\ 0 & mz \end{vmatrix}$$

As ma approaches the values for the totally submerged tether, the formulation is identical with that of the formulation for the structural mass above.

T^t = the transpose matrix of T

3.3 TOTAL APPLIED FORCES

The total applied force Ft is given by

$$Ft = Fk + Fs + Fi + Fm$$

where

Fk = the internal force due to bending
= structural stiffness (K, see below) * displacement

Fs = externally applied forces due to springs at the end nodes
= linear end spring stiffness * displacement

Fi = integrated forces, i.e.
1. gravity
2. hydrostatic
3. drag
4. wave inertia
5. Froude Krylov
6. slam

Fm = force due to calculation in a moving reference frame (installed tethers only)

The structural stiffness matrix is given by:

$$K = \frac{EI}{L^3}$$

12	0	0	6L	-12	0	0	6L
0	12	-6L	0	0	-12	-6L	0
0	-6L	$4L^2$	0	0	6L	$2L^2$	0
6L	0	0	$4L^2$	-6L	0	0	$2L^2$
-12	0	0	-6L	12	0	0	-6L
0	-12	6L	0	0	12	6L	0
0	-6L	$2L^2$	0	0	6L	$4L^2$	0
6L	0	0	$2L^2$	-6L	0	0	$4L^2$

E = Young's Modulus of elasticity
I = Second moment of area
L = Length

The integrated forces vector Fi is given by:

Fi = Fx (due to lateral forces) + Fm (due to applied moments)

and, similar to the mass matrix, is integrated along the element i.e.

$$Fx = \int_{L1}^{L2} T\ fx.dx \qquad Fm = \int_{L1}^{L2} B\ fm.dx$$

where

fx = lateral force at point along the element, due to addition of the 6 forces above
fm = moment at point along the element, to which only the hydrostatic force contributes, as it does not act on or at right angles to the axis of the tube

B is similar to T, but is the transfer function for the forces/moments at the ends, due to an applied moment at a point along the element, and is given by

$$B = \begin{bmatrix} 0 & -b1 \\ b1 & 0 \\ bm1 & 0 \\ 0 & bm1 \\ 0 & b1 \\ -b1 & 0 \\ bm2 & 0 \\ 0 & bm2 \end{bmatrix}$$

where

b1 = 6a(1-a)/L
bm1 = 1+3a²-4a
bm2 = 3a² -2a

The moving reference frame force vector is given by

Fm= (total mass matrix) * (acceleration of the moving reference frame)

3.4 INTEGRATION ACCURACY OF ADDED MASS AND ELEMENT FORCES

For greater accuracy of the integration of the added mass and forces, the element is split into integration lengths, no greater than wavelength/4 for AQWA-NAUT, and no greater than wave-length/4 of the (4*NSPL/5+1)th spectral line for AQWA-DRIFT (NSPL= number of spectral lines).

For each of these integration lengths, the wave surface relative to the element (which has a fitted cubic displacement function) is calculated at 4 Gauss points and a cubic equation is fitted to the wave surface relative to the cubic displacement of the element. This gives a maximum error of approximately 1%. The cubic equation is scanned for zeros, assuming a linear piecewise fit at 23 locations along the integration length.

These integration lengths are then further split, where the water surface cuts the tube (up to 7 lengths) to eliminate discontinuities. These are the integration limits L1,L2 referred to in the previous section.

3.5 ASSEMBLY OF THE ELEMENTS EQUATIONS

For each element, the equations of motion are assembled to give the global equations of motion for the whole tether. As each mass matrix is an 8*8 matrix, the global mass matrix is a symmetric banded matrix of semi-bandwidth 8. The assembled equation has 4*(number of nodes) unknown accelerations.

3.6 INTEGRATION IN TIME OF THE EQUATION OF MOTION

The global equation of motion is given by:

$$M A = F_t$$

where

M	=	mass matrix
A	=	unknown accelerations
F_t	=	total applied forces

Due to the high frequencies present in the higher modes of vibration, a semi-implicit two stage predictor corrector integration scheme is used, to integrate in time for velocity and displacement.

The higher frequencies, and hence the semi-implicit aspect of the formulation, involve the forces due to the structural bending.

We thus write the equation:

$$M A = F - Kx$$

where

K	=	structural stiffness
x	=	displacements at the nodes
F	=	forces other than those due to structural stiffness

At the first stage of the integration scheme, at time t, we write

$$\begin{aligned} M_t\, a_1 &= F_t - Kx_{t+dt} \\ &= F_t - K(x + v\, dt/2 + a_1 dt^2/4) \\ (M_t + Kdt^2/4)a_1 &= F_t - K(x_t + v_t\, dt/2) \\ v^*_{t+dt} &= v_t + a_1 dt \\ x^*_{t+dt} &= x_t + (v_t + v^*_{t+dt})dt/2 \end{aligned}$$

and, at the second stage

$$M_{t+dt}\, a_2 = F_{t+dt} - Kx_{t+dt/2}$$

wher
e the added mass and forces at t+dt are calculated using x*, v*

$$(M_{t+dt} + Kdt^2/4)a_2 = F_{t+dt} - K(x_t + v_t dt/2)$$

The velocity and displacement at time t+dt are then given by

$$v_{t+dt} = v_t + (a_1 + a_2)dt/2$$
$$x_{t+dt} = x_t + (v_t + v_{t+dt})dt/2$$

For some extreme cases of loading, the above time-centred scheme may be unstable. A factor b is therefore introduced, which makes the formulation non-time-centred and increases the stability but reduces the accuracy, which, for time steps typically used, is higher than necessary, using the time-centred scheme.

Introducing b gives

$$M_t\ a_1 = F_t - K(x_t + b\ v_t\ dt + b\ a_1\ dt^2/2)$$

and

$$M_{t+dt}\ a_2 = F_{t+dt} - K(x_t + b\ v_t\ dt + b\ a_2\ dt^2/2)$$

We note that, in the previous formulation the value of b was 0.5. Tests have shown that the optimum value for b is 0.54, which gives maximum stability and accuracy. This value is used in the program at present.

3.7 FATIGUE/EXTREME VALUE STATISTICAL POST-PROCESSING (TOWED TETHERS ONLY)

AQWA-DRIFT also calculates the fatigue life along the tether. The formula used to calculate the fatigue life is

$$\text{damage/day} = \sum_{i=1}^{NBIN} \frac{R(i) * SCF^{m}}{A} * N(i)$$

fatigue life (days) = 1/(damage/day)

where

R(i)	=	stress range (computed from rainflow count of time history stresses)
N(i)	=	number of cycles per day for this stress range (from probability distribution by rainflow count)
SCF	=	stress concentration factor (input by user)
m	=	SN curve slope (input by user)
A	=	SN curve intercept coefficient (input by user)
NBIN	=	number of bins in the stress probability distribution

The extreme values of stress are based on the assumption that stress has a Rayleigh distribution. The peak stress is given by

peak stress in N hours = ABS(mean stress)+(RMS stress)*ln(sqrt(N*n)/2)

where

n	=	the number of cycles/hour, based on the stress time history calculation of the mean of the number of positive and negative peaks

3.8 AXIAL STRESSES DUE TO TETHER IMPACT (INSTALLED TETHERS ONLY)

The axial stresses due to impact are considered to act simultaneously along the whole of the member, as the speed of the shock wave is large compared with the time step. The stresses are assumed to decay exponentially and are given by

$$\text{stress} = VA\, e^{-Bt}$$

where

V = velocity on impact
A = user defined factor
B = 0.693/b

As $e^{-0.693}$ is equal to 0.5, b is the half life of the shock wave. It is specified by the user.

CHAPTER 4 - MODELLING TECHNIQUES FOR TETHERS

The analysis of towed tethers is an independent process and requires no backing files from other programs in the AQWA suite. For installed tethers, an AQWA-LINE run is required for diffracting structures but for non-diffracting structures which do not require an AQWA-LINE analysis, a tube model can be used.

As tethers are regarded as a mooring capability, a nominal structure must be input for towed tethers. This defines the position of the axis system, in which the towed tether displacements are output, and in which the eigenvalue solution is performed. The structure plays no other part in the analysis.

AQWA-NAUT and AQWA-DRIFT require the following categories of modelling information:

1. Structure description (nominal for towed tethers)
2. Tether geometry and properties
3. Environment (water depth, current, waves)
4. Time integration parameters

The modelling techniques are based on the following limitations and assumptions of the program.

1. No Axial Motion - Towed tethers are not considered to move in the axial direction or rotate about the axis of the tether, i.e. displacements of the tether are 2 translations and 2 rotations at each node. These displacements are considered as small motions from the tether axis (TLA q.v.)

Note: Although current in the axial direction will produce stabilizing effects, if the tether spring at the ends are very soft, large rotations (>30 degrees) may be produced, which will invalidate the analysis.

The program also takes full account of the change in encounter frequency, due to the component of the current in the direction of the waves.

2. Axial Tension - Both the wall and effective tensions in a towed tether are assumed to be zero, and hence the bending stiffness is purely structural. The tether responses, especially in the fundamental mode, may be inaccurate if this tension is significant.

Note: This also means that the tether may not be analysed, if any point moves to a depth where the effective tension is significant, i.e. for upending.

3. Small Motions - It is assumed that the lateral and rotational motions of the tether from the defined tether axis are small. This means that the program is unsuitable for large rotations about the Y or Z axis, e.g. for upending. However, full account is taken of the phase shift of the waves, due to movement in the direction of the wave/wave spectrum.

4. Mass/Stiffness - The mass/stiffness ratio of any element must not be too small. Very short elements inherently have small mass/stiffness ratios. This gives rise to very high frequencies. These high frequencies may cause stability problems and roundoff errors in the programs. A general rule is that natural periods of less than 1/100th second are not allowed. These periods are output from the eigenvalue analysis.

   Very short elements should therefore be modelled with a value of Young's modulus reduced so that no periods less than 1/100th second are present. The user can check that the bending of short elements is still small, using the graphical output.

5. Timestep - The timestep must be small enough to resolve the response motion of the tether. This includes any transients that may be present either initially or, more importantly, throughout the analysis. Although a good rule of thumb is that the timestep should be 1/10th of the period of any response, the best method of checking the timestep is to re-run a short simulation with half the timestep and compare the bending moments or stresses for both runs. These should be approximately the same for both runs. Timesteps of 0.25 seconds are typically used.

   For towed tethers, the local axis (TLA) must be defined parallel to, and in the same direction as, the X axis of the fixed reference axes (FRA) i.e. XY in the water plane and Z vertical. The X axis coincides with the zero current wave direction. The nodes of the tether increase with positive X. The last node of the tether, at zero FRA displacement, lies at the TLA origin.

   For installed tethers, the TLA is parallel to the FRA, when the tether is vertical. In general, the TLA X axis goes from the anchor node to the attachment node, the Y axis is in the plane of the XY FRA, and the Z axis follows the right hand rule. The TLA origin is at the anchor node.

CHAPTER 5 - ANALYSIS PROCEDURE

As there is no motion response at drift frequencies, for towed tethers, only one type of analysis (i.e. response at wave frequencies) is available for AQWA-DRIFT and AQWA-NAUT. For installed tethers, the drift frequency response will depend on the structure.

All programs in the AQWA suite have the facility of running one or more stages of the analysis separately. These stages are referred to in the documentation as **Restart Stages** (see Chapter 2 of the AQWA Reference Manual).

Use of the restart facility means that information may be required from a backing file created by a previous program run, instead of from the normal card image file.

These stages are as follows:

Stage 1 - Geometric Definition and Static Environment

Stage 2 - Input of the Diffraction/Radiation Analysis Parameters

Stage 3 - The Diffraction/Radiation Analysis (for the structure, for installed tethers)

Stage 4 - Input of the Analysis Environment

Stage 5 - Motion Analysis

Stage 6 - Graphical Display of Model and Results

The following procedure should be used to perform an analysis in AQWA-DRIFT or AQWA-NAUT:

1. Select a consistent set of units.
2. Identify the geometric and material data for the tether.
3. List all relevant coordinates.
4. Specify a nominal point mass and inertia to represent the towing vessel for towed tethers, or a full description of the structure, for installed tethers (see AQWA-LINE/ NAUT/DRIFT manuals).
5. Specify a nominal hydrostatic stiffness for the towing vessel (see AQWA-LINE/ NAUT/DRIFT manual).
6. Specify the spectrum (AQWA-DRIFT) or regular wave (AQWA-NAUT).
7. Describe the tether in terms of (2) and (3) and request an eigenvalue analysis.

8. Specify an initial position for the vessel (nominal for towed tethers).

9. Specify total simulation time and time step length.

10. Decide output for printer and graphics during simulation.

11. Create a data file, as described in Chapter 6.

12. Perform a DATA run (i.e. with the DATA option), which will provide preliminary checks on the card image data file.

13. After a successful DATA run, check the lowest natural period and adjust the value of Young's Modulus if required. Re-run as necessary.

14. When satisfied with the model, remove the DATA option and re-run to perform Stage 5, the motion analysis.

15. Inspect the listing file and run AQWA-PLANE to inspect the results graphically.

CHAPTER 6 - DATA REQUIREMENT AND PREPARATION

This chapter describes, in order, the data expected by the programs but, except for the input of the tether description in Deck 14 (q.v.), does not give detailed formats. The detailed formats may be found in the AQWA Reference Manual.

The data is input in a series of decks as follows:

Deck 0 - Preliminary Deck

JOB Line - This contains information stating the program to be used, the type of analysis to be undertaken, and the user identifier for the run. The analysis specified for AQWA-DRIFT is WFRQ for towed tethers, WFRQ/DRFT for installed tethers. It is left blank for AQWA-NAUT.

TITLE Line - Title for the run.

OPTIONS Line - Numerous program options are available within the AQWA suite, some of which are common to all programs, while others are for specific programs. The options normally used for analysis of towed tethers are:

LSTF	-	Mandatory for the nominal vessel
NOST	-	No statistics for vessel, as motions should all be zero (AQWA-DRIFT only. Ignored by AQWA-NAUT)
DATA	-	Used for preliminary checking. Only performs Stages 1, 2 and 4
REST	-	Required if restarts are used

RESTART Line - If the restart option is used, then the start and finish stages of the analysis must be input on the restart line. As the amount of data for towed line tethers is relatively small, restart stages are not normally used.

For complete details of the above formats, see the AQWA Reference Manual.

6.1 STAGE 1 - DECKS 1 TO 5 - GEOMETRIC DEFINITION AND STATIC ENVIRONMENT

Input for Stage 1 of the analysis is necessary if the restart stage at which the analysis begins is 1 (see Chapter 5). If the restart stage is greater than 1 there is **no input** for Stage 1 of the analysis.

For Towed Tethers:

Deck 1

a) The coordinates of the nominal vessel centre of gravity. This should always be zero, but must be input.

b) The coordinates of the trailing end of the tether. The X coordinate should be **minus** the total tether length. The Y value must be zero. Z value may be input as zero but see below.

The Z coordinate may be input to define the TLA (tether axis) above or below the water surface. Input of a Z coordinate will mean that:

- the eigenvalue analysis will be performed with the tether axis at this Z value. Depending on the value of Z, the tether may be (a) completely out of water (Z greater than the largest element diameter), (b) partially submerged or (c) fully submerged.
- all displacements will be output with reference to this Z value.
- the initial position of the tether (for the motion response analysis stage) will have this Z value. It is not recommended to "drop" the tether into the water from a height (positive Z value) as this will produce large initial transients.

c) The relative coordinates of the towed tether nodes are defined along the X axis, with the Y values zero.

Deck 2 - A point mass element to represent the vessel.

Deck 3 - A mass to represent the vessel.
- One or more densities for the tether elements.

Deck 4 - Inertia of the point mass representing the vessel.
- Diameter, thickness, drag and added mass coefficients, for each different tether element.

Deck 5 - Static environmental parameters, i.e. depth and density of the water, and acceleration due to gravity.

For Installed Tethers:

For installed tethers, the vessel must be described as specified in the AQWA-LINE/DRIFT/NAUT manuals. The relative coordinates of the installed tether are defined along the Z axis, with the X and Y values zero.

6.2 STAGE 2 - DECKS 6 TO 8 - THE HYDROSTATIC VESSEL DESCRIPTION

Input for Stage 2 of the analysis is only necessary if the restart stage at which the analysis begins is Stage 1 or 2 (see Chapter 5). If the restart stage is greater than 2, there is **no input** for Stage 2 of the analysis.

Deck 6 - No input required (Deck Header NONE).

Deck 7 - Nominal linear hydrostatic stiffness matrix for the vessel.
- The depth below the still water level of the centre of gravity, which must be the same as the coordinate of the trailing end of the tether, input in Deck 1.
- The hydrostatic force on the vessel which must be equal to the weight (i.e. mass * acceleration due to gravity).

Deck 8 - No input required (Deck Header NONE).

6.3 STAGE 3 - DIFFRACTION/RADIATION ANALYSIS

Not required for towed tethers. See AQWA-LINE manual, for installed tethers.

6.4 STAGE 4 - DECKS 9 TO 18 - INPUT OF THE ANALYSIS ENVIRONMENT

Input for Stage 4 of the analysis is always mandatory, if the finish restart stage is equal to or greater than 5. (Note that the default restart stages analysed are 1-5).

Deck 9 - No input required (Deck Header NONE).

Deck 10 - Current speed and direction (AQWA-NAUT **only**).

Deck 11 - No input required (Deck Header NONE).

Deck 12 - No input required (Deck Header NONE).

Deck 13 - For AQWA-DRIFT

- Current speed and direction.
- Description of the wave spectrum.

For AQWA-NAUT

- Wave amplitude, period and direction.

Deck 14 - Description of tether elements and end springs.
- Fatigue and Extreme value period (AQWA-DRIFT **only**).

Deck 15 - Initial position of the vessel, which must be the same as the coordinate of the centre of gravity.

Deck 16 - Number of timesteps, timestep length and start time.

Deck 17 - Slam coefficient multiplier (if required) - default is 0, i.e. switched off. Set the value to 1.0, to switch on. Not applicable for installed tethers.

Deck 18 - Frequency of line printer output.
- Frequency of output records for graphics/statistical analysis.
- Start and finish times for the statistical/fatigue analysis. (AQWA-DRIFT **only**). Normally, initial transients are present at the start of the simulation, which should be omitted from the statistical/fatigue analysis.

CHAPTER 7 - OUTPUT DESCRIPTION

This section describes the **additional** output for a tether analysis for AQWA-DRIFT and AQWA-NAUT. All other output description may be found in the AQWA-DRIFT and AQWA-NAUT manuals.

Each section below describes the output for the corresponding figure, i.e. for Section 7.1 see Figure 7.1 etc.

The data listing output (7.1) and eigenvalue analysis output (7.2) is printed before the simulation and will therefore be output for a DATA run.

The motion analysis is in two sections. The first is the time history (7.3, 7.4) and the second is the statistics. Note that statistics are only output for AQWA-DRIFT.

The statistics output (7.5-7.10) can be divided into four categories:

1. Type 1 - Tabulated by global statistical parameters i.e. mean/2*RMS,mean, highest 1/3 peaks, etc.

   A single page for each nodal motion (motions) and a single page for each element end (forces and stresses).

2. Type 2 - Tabulated by distance along the tether.

   These are the same as the global statistics Type 1 values, but only the mean, RMS, and maximum and minimum peaks are output.

3. - Stress Range Probability Distribution, based on the rainflow method (towed tethers only).

4. - Fatigue and Extreme Values (towed tethers only).

These are described in more detail in the following sections.

The example described below is for a towed tether. The output is very similar for both types of tether. In the following sections, the trailing end will be relevant for towed tethers and the anchor end for installed tethers.

7.1 DATA LISTING TETHER DESCRIPTION

The echoes of the tether geometry and properties are tabulated and summarised in a DATA run (Stages 1-4) as follows. The same output is used for installed tethers and towed tethers.

The table at the top of the page lists the nodes and elements in reverse order (for convenience for installed tethers).

DISTANCE - The distance shown in the second column is the distance from the trailing/ anchor end. Hence, the vessel is at the top of the table (which should show the total length of the tether), and the trailing/anchor end is at the bottom (always at a distance of zero). These distances are the reference for all other output, particular to a node.

NODES ETC - The node numbers, material group and geometric group numbers are echoes of the user input.

AREAS - The cross sectional area and second moments of area (I) are calculated from the outside diameter and the thickness of the element.

The EI value is the second moment of area multiplied by Young's Modulus.

The EA value is the cross sectional area multiplied by Young's Modulus - not used for towed tethers.

The Cap Area is the area which is not subject to external pressure by the water, at the anchor and vessel ends - not used for towed tethers.

The External Diameter Area is the area based on outside diameter.

SPRINGS - The three springs at the vessel and trailing anchor ends are shown at the top and bottom of the table respectively.

For towed tethers, the "Anchor Position in the FRA" and the "Vessel Attachment Initial Position" must lie along the FRA X axis, in Figure 7.2, this is 0.5m below the surface. For installed tethers, the tether axis (TLA) is initially parallel to the FRA. This is the position for the eigenvalue analysis, i.e. the tether initial position, at which the springs input in Deck 14 have no extension. The 'Unstretched Length of Tether' and the 'Initial Distance between Anchor/Attachment' are both the total length of the tether, for towed tethers. For installed tethers, the initial distance may be different.

The weight and buoyancy are then output for the **totally submerged** tether. As the "End Cap Buoyancy" is always zero for towed tethers, the "Free Hanging Reaction" is the reaction that the end springs exert on the tether when completely submerged (i.e. minus the reserve buoyancy). For installed tethers, this refers to areas which are **not** subject to hydrostatic pressure.

All other parameters may be ignored for towed tethers.

For installed tethers, the internal fluid and stress impact value are echoes of the values input by the user, on the TIFL and TIMP cards.

The other group factor specifies the number of tethers in the bundle.

7.2 EIGENVALUE ANALYSIS OUTPUT

Figure 7.2 shows the output for the eigenvalue solution. A page is output for each mode requested on the TEIG card in Deck 14.

The eigenvalue modes/natural modes of motion are output in descending order of natural period, with any mechanism/rigid body modes first. In cases where the end spring values input in Deck 14, are very small, there are four rigid body modes, i.e. two translations and two rotations. The trivial values for these frequencies/periods are output. If significant end springs are used, these will be non-trivial.

The mode freedom position is the position in the global mass/stiffness matrix for this mode. This is used for special testing and may be ignored by the user, except upon advice of the program support team. Natural frequencies and period are then output.

The lateral displacements and the slope at each node are then output for this mode. These are the eigenvectors of the analysis, normalised to unit displacement or ten degrees.

7.3 TIME HISTORY OF TETHER POSITIONS

At each time requested by the user, the positions, velocities and accelerations are shown relative to the tether axis system (TLA).

These values are also output to backing file, for post processing with AQWA-PLANE.

7.4 TIME HISTORY OF FORCES AND STRESSES

See Figure 7.11, for installed tethers.

At each time requested by the user, the forces and stresses for each element are output.

The effective and wall tensions will always be zero for towed tethers.

The bending moments are "hogging positive", by convention.

The Maximum Bending Stress is the maximum around the circumference of the tether.

For towed tethers, the following values are output to backing file, for post-processing with AQWA-PLANE:

- BMY bending moment about the y axis;
- BMZ bending moment about the z axis;
- BM (resultant) at the position, around the circumference, which has the maximum r.m.s. BM over specified time;
- maximum stress, at any point around the circumference;
- bending stress about y axis;
- bending stress about z axis;
- stress at the position, around the circumference, which has the maximum r.m.s. stress .

For installed tethers, the parameters are:

- effective tension;
- wall tension;
- shear stress;
- maximum axial and bending stress;
- minimum axial and bending stress;
- maximum von mise stress;
- Y Bending stress.

7.5 STATISTICS TYPE 1 - DISPLACEMENT/VELOCITIES AND ACCELERATIONS

Figure 7.5 shows the motion global statistics for the **position** of the trailing end of the tether, i.e. DISTANCE = 0. The same format is then repeated for velocity and acceleration, and then repeated for each distance, i.e. for each node along the tether.

Further output will be subtitled:

NODE	1	DISTANCE	0.00	- VELOCITY
NODE	1	DISTANCE	0.00	- ACCELERATION
NODE	2	DISTANCE	88.47	- VELOCITY
NODE	2	DISTANCE	88.47	- VELOCITY
NODE	2	DISTANCE	88.47	- ACCELERATION

etc.

7.6 STATISTICS TYPE 1 - BENDING MOMENTS AND STRESSES

The global statistics for forces/stress are shown in Figure 7.6 for towed tethers, and in Figure 7.12 for installed tethers. The values on which these are based are all those in the time history output except for the last column, labelled MAX SG BND STRESS (maximum significant bending stress) for towed tethers. This is the significant bending stress at the point around the circumference where the **significant stress is a maximum**. Note that this is not the same as the MAX BND STRESS (maximum bending stress) which is the maximum around the circumference **at each point in time** which, in general, will be at different points on the circumference, at different times.

Figure 7.5 shows the force/stress global statistics for Element 1 at the first end i.e. at distance 0.00. The same format is repeated for End 2 of Element 1, and then for each element along the tether, so further output will be subtitled:

ELEMENT 1 DISTANCE 88.47 - BENDING MOMENTS AND STRESSES
ELEMENT 2 DISTANCE 88.47 - BENDING MOMENTS AND STRESSES
ELEMENT 2 DISTANCE 176.94 - BENDING MOMENTS AND STRESSES
etc.

7.7 STATISTICS TYPE 2 - DISPLACEMENT/VELOCITIES AND ACCELERATIONS

These are identical to the values in the Type 1 output, but are tabulated by distance along the tether. A new page is output for each global statistic parameter. The three further pages output are subtitled:

- 2 x RMS
- MAXIMUM PEAKS
- MINIMUM PEAKS

7.8 STATISTICS TYPE 2 - BENDING MOMENTS AND STRESSES

See Figure 7.13 for installed tethers.

These are identical to the values in the Type 1 output, but are tabulated by distance along the tether. A new page is output for each global statistic parameter. The three further pages output are subtitled:

- 2 x RMS
- MAXIMUM PEAKS
- MINIMUM PEAKS

7.9 STRESS RANGE PROBABILITY DISTRIBUTION (TOWED TETHERS ONLY)

The stress probability distribution is output at the point of maximum fatigue damage. The position of this point is shown in Figure 7.10

7.10 FATIGUE ANALYSIS AND PEAK STRESS (TOWED TETHERS ONLY)

The stress concentration factor and SN parameters are echoes of the data input in Deck 14. See Section 3.6 for the theory associated with these calculations.

The position (PN.DEG) of maximum fatigue and maximum peak stress are found by scanning around the circumference of the tether every 10 degrees, and using the maximum damage/peak stress respectively.

The SIGNIFICANT BENDING MOMENTS output in Figure 7.10 are a repeat of the values output in Figure 7.8.

The MAX DAM (maximum damage) is the significant bending moment at the point of maximum fatigue damage.

The EFFECTVE STRS RNG (effective stress range) is the stress range that would give the same damage as the sum of the damage due to each of the stress ranges, assuming that the number of cycles is the same as the total number of cycles, for all stress ranges.

The CY/HR (cycles/hour) is the total number of stress ranges in a one hour period. This is the total number from Figure 7.9 divided by the number of hours of simulation.

For further details of the DAMAGE/HR and FATIGUE LIFE-DYS (fatigue life in days) see Section 3.6.

The MAX PK is the maximum stress around the circumference during the simulation.

The SIGNFCNT(significant) stress is the significant stress, at the position on the circumference of maximum peak stress, expected in a N(user specified) hour period.

The CYC/HR(cycles/hour) is the mean of the number of positive and negative peaks of the stress, at the position on the circumference of maximum peak stress, expected in a N(user specified) hour period.

The 3HR PK STRESS (3 hour peak stress) is the peak stress expected in an 3 hour period. The actual number of hours (default =3) may be specified by the user. For details of the calculation, see Section 3.6.

* * * * D E S C R I P T I O N O F T E N S I O N L E G T E T H E R 1* * * *

- -

TETHER NODE	DIST-ANCE	NODE 1	NODE 2	MATE GROUP	GEOM GROUP	X-SECT AREA	2ND-MOM OF AREA	EI	EA	END CAPS CAP AREA	END CAPS EXTERNAL DIAM	END CAPS AREA	SPRINGS/CONSTRAINTS INLINE/VERTICAL	SPRINGS/CONSTRAINTS X ROT COIL	SPRINGS/CONSTRAINTS Y ROT COIL
4	265.4									0.000			1.00E+01	0.00E+00	0.00E+00
		103	104	101	101	0.1203	0.017640	3.793E+06	2.586E+07		0.982				
3	176.9														
		102	103	101	101	0.1203	0.017640	3.793E+06	2.586E+07		0.982				
2	88.5														
		101	102	101	101	0.1203	0.017640	3.793E+06	2.586E+07		0.982				
1	0.0									0.000			1.00E+01	0.00E+00	0.00E+00

```
TETHER CONFIGURATION- . . . . . = TOWED
VESSEL ATTACHMENT   - NODE NUMBER . . . . . =         5
                    - POSITION IN FRA . . . . =     0.000     0.000     0.000
                    - INITIAL POSITION  . . . =     0.000     0.000    -0.500

ANCHOR ATTACHMENT   - AT NODE NUMBER  . . . . =         6
                    - POSITION IN FRA . . . . =  -260.000     0.000    -0.500
                    - STOP DIST BELOW ANCHOR. =   100.000

UNSTRETCHED LENGTH OF TETHER  . . . . . =   260.000
INITIAL DISTANCE BETWEEN ANCHOR/ATTACHMENT. . =   260.000

LONGITUDAL STIFFNESS OF COMPLETE TETHER . . . = 9.999E+00

WEIGHT OF TETHER                            = 2.632E+03
BUOYANCY OF TETHER(EXCLUDING END CAP EFFECTS) =-2.625E+03
END CAP BUOYANCY    (TETHER ASSUMED VERTICAL) = 0.000E+00
FREE HANGING REACTION          (SUM OF ABOVE) = 6.647E+00

INTERNAL FLUID      - PRESSURE AT SEA LEVEL . = 0.000E+00
                    - DENSITY . . . . . =     0.000

IMPACT COEFFICIENTS - AXIAL STRESS FACTOR . . = 1.000E+02
                      HALF LIFE (SECONDS) . . =   100.000

TETHER GROUP FACTOR(FACTOR FOR VESSEL FORCES  =         0
```

Figure 7.1 - Data Listing Tether Description

```
* * * * E I G E N   S O L U T I O N   M O D E   1 - T E T H E R   N U M B E R   1 * * * *

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                    MODE FREEDOM POSN   =  2

                    FREQUENCY (RAD/SEC) =  0.1434
                    FREQUENCY (HERTZ)   =  0.0228

                    PERIOD    (SECONDS) =   43.82
```

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT Y	LATERAL DISPLACEMENT Z	SLOPE (DEG) RY	SLOPE (DEG) RZ
4	265.41	0.0000	0.4465	0.4366	0.0000
3	176.94	0.0000	1.0000	0.2144	0.0000
2	88.47	0.0000	1.0000	-0.2144	0.0000
1	0.00	0.0000	0.4465	-0.4366	0.0000

Figure 7.2 - Eigenvalue Analysis Output

* * * * T I M E H I S T O R Y O F S I N G L E T E T H E R N U M B E R 1 * * * *

STEP NUMB	TIME (SECONDS)	NODE	POSITION ALONG TETHER	P O S I T I O N S Y	Z	RY	RZ	V E L O C I T I E S Y	Z	RY	RZ	A C C E L E R A T I O N S Y	Z	RY	RZ
1	0.00	4	265.4	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.117	0.000	0.000
		3	176.9	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.117	0.000	0.000
		2	88.5	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.117	0.000	0.000
		1	0.0	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.117	0.000	0.000

Figure 7.3 - Time History of Tether Motions

* * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * *

NODE NUMB	DIST-ANCE	EFFECTIVE TENSIONS	WALL	SHEAR FORCE Y	SHEAR FORCE Z	BENDING MOMENTS Y	BENDING MOMENTS Z	SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES Y	STRESSES Z	UNKNOWN CRITERIA
4	265.4	0.000E+00										
			0.000E+00	0.000E+00	0.000E+00	-7.629E-06	0.000E+00	0.00E+00	2.42E-04	-2.42E-04	1.08E-28	0.00E+00
			0.000E+00	0.000E+00	-1.020E-04	1.916E-02	0.000E+00	0.00E+00	6.07E-01	6.07E-01	1.08E-28	0.00E+00
3	176.9	0.000E+00										
			0.000E+00	0.000E+00	1.035E-04	1.915E-02	0.000E+00	0.00E+00	6.07E-01	6.07E-01	1.08E-28	0.00E+00
			0.000E+00	0.000E+00	1.636E-04	1.917E-02	0.000E+00	0.00E+00	6.08E-01	6.08E-01	1.08E-28	0.00E+00
2	88.5	0.000E+00										
			0.000E+00	0.000E+00	-1.636E-04	1.918E-02	0.000E+00	0.00E+00	6.08E-01	6.08E-01	1.08E-28	0.00E+00
			0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.00E+00	1.08E-28	1.08E-28	1.08E-28	0.00E+00
1	0.0	0.000E+00										

Figure 7.4 - Time History of Forces and Stresses (towed tethers)

```
            * * * * T E T H E R   1   S T A T I S T I C S * * * *

       - - - - - - - - - - - - - - - - - - -

        RECORDS     1(TIME=   0.00) TO    11(TIME=   1.00) PROCESSED
        ------------------------------------------------------------
        NODE     1  DISTANCE     0.00  -  POSITION
        ------------------------------------------

-------------------------------------------------------------------------
                          SWAY(Y)      HEAVE(Z)      PITCH(Y)       YAW(Z)
-------------------------------------------------------------------------

 MEAN VALUE               0.0000       -0.0174        0.0010        0.0000

 2  x R.M.S               0.0000        0.0307        0.0022        0.0000

 MEAN HIGHEST    +        0.0000        0.0230        0.0000        0.0000
 1/3  PEAKS      -        0.0000        0.0210        0.0000        0.0000

 MAXIMUM PEAKS   +        0.0000        0.0000        0.0034        0.0000
                          0.0000        0.0000        0.0012        0.0000
                          0.0000        0.0000        0.0006        0.0000

 MINIMUM PEAKS   -        0.0000       -0.0460       -0.1340        0.0000
                          0.0000       -0.0332       -0.0910        0.0000
                          0.0000       -0.0300       -0.0800        0.0000
```

Figure 7.5 - Statistics Type 1 - Displacement/Velocities and Accelerations

* * * * T E T H E R 1 S T A T I S T I C S * * * *

- - - - - - - - - - - - - - - - - - -

RECORDS 1(TIME= 0.00) TO 11(TIME= 1.00) PROCESSED

ELEMENT 1 DISTANCE 0.00 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		4.7684E-07	0.0000E+00	4.7684E-07	5.9070E-05	1.5111E-05	1.0806E-28	1.5111E-05
2 x R.M.S		6.8891E-06	0.0000E+00	6.8891E-06	1.8606E-04	2.1832E-04	0.0000E+00	2.1832E-04
MEAN HIGHEST	+	7.1526E-06	0.0000E+00	7.1526E-06	1.8271E-04	2.2667E-04	0.0000E+00	2.2667E-04
1/3 PEAKS	-	-8.1062E-06	0.0000E+00	-8.1062E-06	-5.9070E-05	-2.5689E-04	0.0000E+00	-2.5689E-04
MAXIMUM PEAKS	+	7.6294E-06	0.0000E+00	7.6294E-06	2.4178E-04	2.4178E-04	1.0806E-28	2.4178E-04
		3.8147E-06	0.0000E+00	3.8147E-06	2.4178E-04	1.2089E-04	0.0000E+00	1.2089E-04
		1.4305E-06	0.0000E+00	1.4305E-06	4.5333E-05	4.5333E-05	0.0000E+00	4.5333E-05
MINIMUM PEAKS	-	-7.6294E-06	0.0000E+00	-7.6294E-06	1.0806E-28	-2.4178E-04	1.0806E-28	-2.4178E-04
		0.0000E+00	0.0000E+00	0.0000E+00	1.0806E-28	1.0806E-28	0.0000E+00	1.0806E-28
		0.0000E+00	0.0000E+00	0.0000E+00	1.0806E-28	1.0806E-28	0.0000E+00	1.0806E-28

Figure 7.6 - Statistics Type 1 - Bending Moments and Stresses (towed tethers)

* * * * T E T H E R - - I - - S T A T I S T I C S * * * *

RECORDS 1(TIME= 0.00) TO 11(TIME= 1.00) PROCESSED

MEAN VALUE

NODE	DISTNCE	POSITION Y	POSITION Z	POSITION RY	POSITION RZ	VELOCITY Y	VELOCITY Z	VELOCITY RY	VELOCITY RZ	ACCELERATION Y	ACCELERATION Z	ACCELERATION RY	ACCELERATION RZ
1	0.00	0.000	-0.017	0.001	0.000	0.000	-0.045	0.003	0.000	0.000	-0.076	0.008	0.000
2	88.47	0.000	-0.018	0.000	0.000	0.000	-0.047	0.000	0.000	0.000	-0.081	-0.001	0.000
3	176.94	0.000	-0.018	0.000	0.000	0.000	-0.047	0.000	0.000	0.000	-0.081	0.001	0.000
4	265.41	0.000	-0.017	-0.001	0.000	0.000	-0.045	-0.003	0.000	0.000	-0.076	-0.008	0.000
MEAN		0.000	-0.018	0.000	0.000	0.000	-0.046	0.000	0.000	0.000	-0.079	0.000	0.000

Figure 7.7 - Statistics Type 2 - Displacement/Velocities and Accelerations

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 1(TIME= 0.00) TO 11(TIME= 1.00) PROCESSED

MEAN VALUE

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
1	0.00	4.768E-07	0.000E+00	4.768E-07	5.907E-05	1.511E-05	1.081E-28	1.511E-05
	88.47	-1.690E-01	0.000E+00	-1.690E-01	5.581E+00	-5.356E+00	1.081E-28	-5.356E+00
2	88.47	-1.690E-01	0.000E+00	-1.690E-01	5.581E+00	-5.356E+00	1.081E-28	-5.356E+00
	176.94	-1.684E-01	0.000E+00	-1.684E-01	5.569E+00	-5.335E+00	1.081E-28	-5.335E+00
3	176.94	-1.684E-01	0.000E+00	-1.684E-01	5.569E+00	-5.335E+00	1.081E-28	-5.335E+00
	265.41	7.369E-07	0.000E+00	7.369E-07	1.113E-04	2.335E-05	1.081E-28	2.335E-05
MEAN		-1.125E-01	0.000E+00	-1.125E-01	3.717E+00	-3.564E+00	1.081E-28	-3.564E+00

Figure 7.8 - Statistics Type 2 - Bending Moments and Stresses (towed tethers)

* * * * T E T H E R 1 S T A T I S T I C S * * * *

- - - - - - - - - - - - - - - - - - -

ELEMENT	1		2		3	
DISTANCE	0	88	88	177	177	265

BIN	STRESS RANGE	PROBABILITY DISTRIBUTION(1/2 CYCLES)					
1	0.00-5.4472E-01	0	21	11	10	2	0
2	5.45-1.0894E+00	0	0	0	0	0	0
3	1.09-1.6342E+00	0	12	15	0	0	0
4	1.63-2.1789E+00	0	0	0	0	0	0
5	2.18-2.7236E+00	0	0	0	0	0	0
6	2.72-3.2683E+00	0	0	0	0	0	0
.		.	.	.	.	.	.
.		.	.	.	.	.	.
.		.	.	.	.	.	.
38	2.02-2.0699E+01	0	0	0	0	0	0
39	2.07-2.1244E+01	0	8	24	0	4	0
40	2.12-2.1789E+01	0	0	11	0	0	0
41	2.18-2.2333E+01	0	13	0	0	0	0
42	2.23-2.2878E+01	0	4	5	3	0	0
43	2.29-2.3423E+01	0	0	0	0	0	0
44	2.34-2.3968E+01	0	8	26	0	4	0
45	2.40-2.4512E+01	0	0	0	0	0	0
46	2.45-2.5057E+01	0	0	10	0	5	0
47	2.51-2.5602E+01	0	0	0	0	0	0
48	2.56-2.6146E+01	0	0	5	0	17	0
49	2.61-2.6691E+01	0	0	0	0	0	0
50	2.67-2.7236E+01	0	0	0	0	0	0

Figure 7.9 - Stress Range Probability Distribution (towed tethers)

```
                    * * * * T E T H E R   1   S T A T I S T I C S * * * *
                        - - - - - - - - - - - - - - - - - -

                    RECORDS     1(TIME=   0.00) TO    11(TIME=   1.00) PROCESSED
                    ------------------------------------------------------------

                    PARAMETER SUMMARY FOR FATIGUE ANALYSIS/MAXIMUM STRESS
                    ----------------------------------------------------
                    Elapsed time(seconds) . . . . . . . . . =    1.000
                    Stress Cutoff value (SO)  . . . . . . . =     0.0000E+00
                    Stress concentration factor . . . . . . =     1.2400
                    SN curve intercept coefficient A  . . . =     1.3367E+24
                    SN curve slope-m  . . . . . . . . . . . =     3.5000
                    Thickness Effect Value. . . . . . . . . =     0.0000
```

	B E N D I N G M O M E N T S*					F A T I G U E				* M A X B E N D I N G S T R E S S				
		SIGNIFICANT		*EFFECTVE	PN.	CYC	DAMAGE	FATIGUE*				PN.	CYC	3HR PK
ELEM	DISTNCE Y	Z	MAX DAM*	STRS RNG	(DEG)	/HR	/HR	LIFE-DYS*	MAX PK	MEAN	SIGNFCNT	(DEG)	/HR	STRESS
1	0.00 6.89E-06	0.00E+00	6.89E-06	3.38E-01	0	9000	1.51E-22	99999.0	2.42E-04	1.51E-05	2.18E-04	0	9999	5.19E-04
	88.47 3.41E-01	0.00E+00	3.41E-01	1.54E+01	0	5400	5.75E-17	99999.0	1.36E+01	-5.36E+00	1.08E+01	0	7200	2.95E+01
2	88.47 3.41E-01	0.00E+00	3.41E-01	1.54E+01	0	5400	5.75E-17	99999.0	1.36E+01	-5.36E+00	1.08E+01	0	7200	2.95E+01
	176.94 3.41E-01	0.00E+00	3.41E-01	1.54E+01	0	5400	5.75E-17	99999.0	1.36E+01	-5.34E+00	1.08E+01	0	7200	2.95E+01
3	176.94 3.41E-01	0.00E+00	3.41E-01	1.54E+01	0	5400	5.75E-17	99999.0	1.36E+01	-5.34E+00	1.08E+01	0	7200	2.95E+01
	265.41 9.23E-06	0.00E+00	9.23E-06	3.38E-01	0	9999	2.11E-22	99999.0	2.42E-04	2.34E-05	2.93E-04	0	9999	6.99E-04
ALONG TETHER	3.41E-01 MAXIMUM	0.00E+00 MAXIMUM	3.41E-01 MAXIMUM	1.54E+01 MAXIMUM	0 MEAN	5400 MAX	5.75E-17 MAXIMUM	99999.0 MINIMUM	1.36E+01 MAXIMUM	6.03E+00 MEAN	1.08E+01 MAXIMUM	0 MEAN	7200 MAX	2.95E+01 MAXIMUM

Figure 7.10 - Fatigue Analysis and Extreme Stress (towed tethers)

* * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * * *

NODE NUMB	ELEV-ATION	TENSIONS EFFECTIVE	TENSIONS WALL	SHEARFORCE X	SHEARFORCE Y	BENDING MOMENTS X	BENDING MOMENTS Y	SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES MAXIMUM MIN	STRESSES VON MISES	STRESSES BENDING Y
4	265.4	4.976E+00										
			-6.97E+02	1.22E+02	-7.83E-04	-9.31E-10	1.04E-05	2.03E+03	-5.41E+03	-5.41E+03	9.93E+03	3.12E-04
			-1.55E+03	2.04E+01	-5.00E-04	-1.15E-02	-5.35E+02	3.39E+02	3.89E+03	-2.79E+04	2.56E+04	1.59E+04
3	176.9	3.317E+00										
			-1.55E+03	-2.04E+01	5.00E-04	1.15E-02	5.35E+02	3.39E+02	3.89E+03	-2.79E+04	2.56E+04	1.59E+04
			-2.40E+03	-6.26E+00	-6.12E-05	9.56E-03	-1.26E+02	1.04E+02	-1.49E+04	-2.24E+04	3.25E+04	3.77E+03
2	88.5	1.658E+00										
			-2.40E+03	6.26E+00	6.12E-05	-9.56E-03	1.26E+02	1.04E+02	-1.49E+04	-2.24E+04	3.25E+04	3.77E+03
			-3.25E+03	-1.13E+01	5.84E-04	-4.65E-10	2.28E-05	1.88E+02	-2.52E+04	-2.52E+04	4.37E+04	-6.80E-04
1	0.0	-7.324E-04										

Figure 7.11 - Time History of Forces and Stresses (installed tethers)

* * * * T E T H E R 1 S T A T I S T I C S * * * *

- - - - - - - - - - - - - - - - - - -

RECORDS 1(TIME= 0.00) TO 21(TIME= 0.20) PROCESSED

ELEMENT 2 ELEVATION 25.00 TENSIONS AND STRESSES

		EFFECTIVE TENSION	WALL TENSION	SHEAR STRESS	MAX BND + AXL STRESS	MIN BND + AXL STRESS	VON MISES STRESS	Y BENDING STRESS
MEAN VALUE		1.0626E+03	8.9739E+02	4.8065E+01	2.2098E+04	1.9477E+04	2.6595E+04	1.0441E+03
2 x R.M.S		1.5734E+00	1.5734E+00	4.8995E+01	2.2407E+03	2.1698E+03	1.9213E+03	2.7156E+03
MEAN HIGHEST	+	1.9747E+00	1.9749E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1/3 PEAKS	-	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
MAXIMUM PEAKS	+	1.0646E+03	8.9936E+02	7.5558E+01	2.4419E+04	2.0753E+04	2.8666E+04	3.5860E+03
		1.0640E+03	8.9871E+02	1.7500E+01	2.1231E+04	2.0342E+04	2.5858E+04	-4.3082E+02
		1.0633E+03	8.9807E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
MINIMUM PEAKS	-	1.0620E+03	8.9677E+02	4.8125E+00	2.0794E+04	1.7247E+04	2.5496E+04	-4.5764E+02
		0.0000E+00	0.0000E+00	2.7993E+01	2.1204E+04	2.0315E+04	2.5836E+04	0.0000E+00
		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

7.12 - Statistics Type 1 - Bending Moments and Stresses (installed tethers)

* * * * T E T H E R 1 S T A T I S T I C S * * * *

- - - - - - - - - - - - - - - - - - -

RECORDS 1(TIME= 0.00) TO 21(TIME= 0.20) PROCESSED

2 x R.M.S

ELEM	ELVTION	EFFECTIVE TENSION	WALL TENSION	SHEAR STRESS	MAX BND + AXL STRESS	MIN BND + AXL STRESS	VON MISES STRESS	Y BENDING STRESS
1	0.00	1.573E+00	1.573E+00	2.369E+02	8.981E+03	8.916E+03	8.774E+03	8.948E+03
	25.00	1.573E+00	1.573E+00	4.899E+01	2.241E+03	2.170E+03	1.921E+03	2.716E+03
2	25.00	1.573E+00	1.573E+00	4.899E+01	2.241E+03	2.170E+03	1.921E+03	2.716E+03
	50.00	1.573E+00	1.573E+00	2.452E+01	7.265E+02	6.709E+02	6.166E+02	1.032E+03
3	50.00	1.573E+00	1.573E+00	2.452E+01	7.265E+02	6.709E+02	6.166E+02	1.032E+03
	75.00	1.573E+00	1.573E+00	5.474E+01	1.174E+03	1.111E+03	1.119E+03	1.507E+03
4	75.00	1.573E+00	1.573E+00	5.474E+01	1.174E+03	1.111E+03	1.119E+03	1.507E+03
	100.00	1.573E+00	1.573E+00	1.804E+02	3.645E+01	3.645E+01	3.846E+01	3.705E-04
MAXIMUM		1.573E+00	1.573E+00	2.369E+02	8.981E+03	8.916E+03	8.774E+03	8.948E+03

Figure 7.13 - Statistics Type 2 - Bending Moments and Stresses (installed tethers)

CHAPTER 8 - EXAMPLE OF PROGRAM USE

8.1 TOWED TETHER MODEL - AQWA-DRIFT EXAMPLE

The towed tether model is shown in Figure 8.1. At the trailing end of the tether is a bottom connector and buoyancy tank, and at the vessel (top) end, a buoyancy tank and threaded section. The elements to model the tether are as follows:

Node	Element		Node Pn	Length	Diameter
1			0.000		
	1	Bottom connector		1.053	2.000
2			1.053		
	2	Bottom buoyancy tank		6.450	2.582
3			7.503		
	3-11	Tether main body		250.087	1.118
12			257.590		
	12	Top buoyancy tank		5.050	1.999
13			262.636		
	13	Threaded section		3.850	0.670
14			266.486		

The input data, shown in Figure 8.2, is described in the following sections:

8.1.0 Preliminary Data

JOB Line

HE01	-	A four-character, user specified, run identifier
DRIF	-	Mandatory code, identifying the AQWA-DRIFT program
WFRQ	-	Mandatory code, for wave frequency response

TITLE Line - Prescribes a title for the run

OPTIONS Line

LSTF	-	Mandatory option specifying that the forces on the nominal vessel are based on a linear stiffness
NOST	-	Omit statistics for the vessel
PRCE	-	Specifies that data echo is required for Decks 1-5
END	-	Mandatory code to indicate end of options

8.1.1 Coordinates

This deck prescribes the coordinate of the centre of gravity of the nominal vessel and the coordinates of the nodes of the tether.

Node	Explanation
1	The coordinates of the trailing end of the tether. Always use 0,0,0 for convenience. Note that these are relative positions, so the coordinate of the vessel end of the tether does not have to be the same as the vessel centre of gravity.
2	The relative position of Tether Node 2.
3-12	The relative position of the tether main body nodes, Nodes 3-12. The positions are generated automatically, at equal distances of 27.787 metres.
13	Relative position of tether node 13.
14	Relative position of the vessel end of the tether.
100	Position of trailing end of the tether in the fixed reference axes (FRA). The X coordinate should be - (total length of the tether). The Z coordinate is -0.5, which is approximately the equilibrium position of the tether. This defines the origin of the tether axis.
999	The coordinates of the centre of gravity of the nominal vessel. Always use 0,0,0.

8.1.2 Element Topology

The single PMAS element describes the nominal vessel as a point mass.

8.1.3 Material Properties

Note that, in the following table, the densities have been slightly adjusted to obtain the exact weights of each section. The main tether body is neutrally buoyant. The Young's modulus values have been adjusted for the shorter elements, not part of the main tether body, to eliminate very high natural frequencies. This gives no significant difference in the response motion and stresses.

Group	Element	Mass/Density	Young's Modulus	Description
1	TUBE	7.850	2.00E5	Bottom connector
2	TUBE	7.850	1.35E7	Bottom buoyancy tank
3	TUBE	7.817	2.15E8	Main tether body
4	TUBE	7.752	1.35E7	Top buoyancy tank
5	TUBE	7.752	1.35E7	Threaded section
999	PMAS	1.E10		Nominal vessel mass

8.1.4 Geometric Properties

The properties of the tether elements are as follows:

Group	Diameter	Thickness	Drag Coeff	Added Mass Coeff	Description
1	2.0000	0.8401	0.75	1.0	Bottom connector
2	2.5822	0.0101	0.75	1.0	Bottom buoyancy tank
3	1.1176	0.0380	0.75	1.0	Main tether body
24	1.9993	0.0389	0.75	1.0	Top buoyancy tank
5	0.6700	0.1065	0.75	1.0	Threaded section

Group 999 gives the Ixx, Iyy and Izz inertias of the nominal vessel.

8.1.5 Global Environment

The depth of water (345m), the density of seawater (1.027 tonnes/m^3) and the acceleration due to gravity (9.81 m/s^2) are input.

8.1.6 Frequencies/Directions

No data is required for Deck 6. Input NONE for the Deck Header.

8.1.7 Specification of Vessel Hydrostatic Stiffness

LSTF - The six LSTF (linear stiffness) cards specify a diagonal hydrostatic stiffness matrix for the nominal vessel. These are nominal (very high) values, to ensure that the vessel has zero motion throughout the simulation

BFEQ - The buoyancy force at equilibrium must be input as the mass $*$ the acceleration due to gravity, i.e. 1.0E10 (input in Deck 3)$*$9.81 (input in Deck 5)=9.81E10

ZCGE - This is the Z co-ordinate of the centre of gravity of the nominal vessel, at equilibrium in still water, i.e. 0.5m below the S.W.L. This must be the same as the Z co-ordinate of the trailing end node (Node 100, input in Deck 1)

8.1.8-12 No data is required for Decks 8 to 12

Input NONE for the Deck Headers.

8.1.13 Wave Spectrum

NSPL - The number of spectral lines. This specifies that the wave spectrum is made up of 50 equal energy wavelets with random phases

SPDN - The direction of the spectrum is 180 degrees, i.e. along the negative tether axis (from the vessel end to the trailing end)

JONS - Specifying a JONSWAP spectrum whose frequency limits are 0.37 to 2.5 rads/sec. Alpha, Gamma and Peak Frequency values are 5.2273, 0.01146 and 0.6411 rads/sec respectively

8.1.14 The Tether Element Topology and Parameters

TELM - The tether element topology. The first two columns refer to the nodes in Deck 1, the third to the material properties specified in Deck 3, and the fourth to the geometric properties specified in Deck 4

TSLK - Specifies that listing file output is only required as specified by the TPRV card in Deck 18

TCAP - Specifies that, as this is not a tension tether, no end cap forces are to be calculated

TIMP - These are two large values (100m) specifying that calculations for impact stress factor and half life for impact are not appropriate

TLOW - This is a large value (100m) specifying that lower stop position below the anchor is not appropriate

TSPV/ TSPA - These are the tether lateral springs at the vessel/trailing end of the tether. The values are specified as small (N.B. zero values must not be input, as default values will be used, appropriate to tension tethers), as the wave direction is along the tether axis. For spectra (or waves for AQWA-NAUT) not along the axis of the tether, nominal value of stiffness (e.g. a few kN/m) must be specified, representing soft springs, such that the tether does not move as a mechanism. The eigenvalue analysis will reflect these values and show whether the system is a mechanism, together with the effect on the natural frequencies, especially at the fundamental mode

High values should not be input, as this may require a smaller timestep to be used for the simulation, which will therefore be more expensive to run

TEIG - Specifies that six modes should be output to the listing files for the eigenvalue analysis. For initial runs, all modes are normally requested (total number of modes = number of nodes $*$ 4)

TETH - The tether card specifies that the input for Tether 1 is complete. The parameters 1 1 0 100 specify that the tether is connected to the vessel (Structure 1) at Node 1 and is fixed, at the trailing end, to Structure 0 (fixed in the FRA) at Node 100 (see Section 8.1.1 Coordinates)

Note that neither TFAT (for the fatigue life parameters) nor TPSH (tether peaks stress hours) have been input, as the default values are appropriate.

8.1.15 Structure/Vessel Initial Conditions

Values of 0, 0, -0.5 (POS1 card) have been input for the initial position of the nominal vessel. This now defines the tether local axis (TLA) for the simulation as the going from Node 100 (fixed) to Node 1 at this position. All positions output for the tether on the listing files and for graphics are with reference to this axis. The eigenvalue solution will also be performed with the tether axis 0.5 metres below the surface, i.e. almost fully submerged.

The velocity of the vessel is input as zero. However, this card may be omitted, as the default value is zero.

8.1.16 Time Integration Parameters

The length of simulation is specified as 1501 timesteps of 0.25 seconds, i.e. $1500*0.25=375$ seconds. The initial time has been left blank, defaulting to zero.

8.1.17 Hydrodynamic Parameters for Non Diffracting Elements

The slam coefficient multiplier has been input as unity. This has the effect of switching on the slam forces on the tether, as the default is zero (i.e. no slam).

8.1.18 Program Output Options

PREV - Print structure every 50 timesteps. As the structure is nominal in this analysis, any large number would be appropriate, to reduce the output

TGRV - Specifies that the records for the tether graphics should be output to backing file (for plotting with AQWA-PLANE) every two timesteps. This is used to reduce the size of the graphics backing files, while still maintaining enough time resolution to describe the tether motions and forces

TPRV - Specifies that the time history should only be output to listing files every 50 timesteps. As graphics are normally used for the inspection of results, the listing file output has limited usefulness for long time histories, except for special tests

TSTS/F - Specifies that the start and finish timesteps for the statistical and fatigue analysis should be 100 and 1501 respectively. As transients are normally present at the beginning (initial 25 seconds) of the simulation, this period has been omitted from the statistical analysis

PTEN - Print tensions. As the tether is classified as a mooring line, the PTEN card must always be present, if tether output is required

NOPR - As the structure is nominal, the output is of little importance. The parameters printed for the structure have therefore been reduced to a minimum

8.1.19-20 No data is required for Decks 19 to 20

Input NONE for the Deck Headers.

8.1.21 Output from the Towed Tether Motion Simulation Run

Only the output which is unique to tether simulation is referred to in this section. See the AQWA-DRIFT manual for details of standard output.

Note also that all output is fully described in the previous section and no attempt has been made to repeat the information. The following highlights important sections of the output.

The results consist of a data echo and a data listing, the latter being a more logically tabulated form of the input data, the time history and statistical analysis.

Data Listing

In Data Listing, in the section of output for tethers entitled "DESCRIPTION OF TENSION LEG TETHER 1", we note that the anchor position in the FRA and the vessel attachment initial position lie along the FRA X axis, at 0.5m below the surface. The 'Unstretched Length of Tether' and the 'Initial Distance between Anchor/Attachment' are both the total length of the tether, i.e. 266.486m.

Total weight/buoyancy force(fully submerged) is 2908 kN/3019 kN giving a reserve buoyancy of 111.1kN.

Eigensolution Output

The eigenvalue solution is then output for each mode requested on the TEIG card in Deck 14. In this example there are four rigid body modes (the end spring values input in Deck 14 are very small), i.e. two translation and two rotation modes. The trivial values for these are output.

The "mode freedom position" is the position in the global mass/stiffness matrix, for this mode. This is used for special testing and may be ignored by the user, except under supervision of the program support team. Natural frequencies and period are then output.

Modes 5 and 6 show the fundamental bending mode for a free/free beam at natural periods of 15.61 and 15.44 seconds. We note that these are not equal, as the added mass in the vertical direction (Mode 5) is slightly greater than that in the horizontal direction (Mode 6) as the tether is not fully submerged.

Time History Output

The time history of the structure and tether are shown only at the initial position and at 250 and 375 seconds (note that the full output is at every 12.5 seconds). Note that as the wave is along the axis of the tether, only two dimensional motions/stresses result.

Tether Statistics

The mean, significant and peak values of the tether motions, forces and stresses are output.

The stress range probability distribution shows numbers of cycles at the peak stresses around the worst nodes, i.e. Nodes 4 and 5. Based on this distribution, the fatigue life is 52.3 days at Node 5 between Elements 5 and 6. The 3hr peak stress (last column) of 206,000kN/m² is also at this node.

8.1.22 AQWA-NAUT Example

A fully annotated example for towed tethers is not yet available for AQWA-NAUT. The following changes are required to convert any AQWA-DRIFT data file, including the above example, to an AQWA-NAUT data file

Deck 0	-	JOB line	-	Replace DRIF by NAUT and delete WFRQ specification
Deck 13	-	SPEC	-	Replace the spectrum deck with the WAVE deck (see AQWA-NAUT manual), with the appropriate wave amplitude and direction (or code NONE for this deck, for still water)
Deck 18	-	PROP	-	The cards relating to the statistical and fatigue analysis may be omitted. These are ignored by AQWA-NAUT

8.2 INSTALLED TETHER MODEL - AQWA-NAUT EXAMPLE

Section 8.2 describes an installed tether model for AQWA-NAUT. Where the input and output is the same as for towed tethers, a full description is omitted. Note that the output described is only a selection of the output produced for installed tethers.

The TLP and installed tether model is shown in Figure 8.3.

The vessel in this example is composed of a point mass and 16 tube elements. As stress analysis post-processing is not required, the steel density is specified as a nominal small number, and the mass is input as a point mass at the required centre of gravity, at an elevation from the keel of 63.6m (node 999). This avoids the process of adjusting the thickness of individual tubes and representing the deck structure, to obtain the correct centre of gravity.

The tethers for this vessel are in four groups, with four tethers in each group. Note that only one of the four tethers in each group is plotted.

The input data, shown in Figure 8.4, is described in the following sections.

8.2.0 Preliminary Data

JOB Line

MINT	-	A four-character, user specified, run identifier
NAUT	-	Mandatory code, identifying the AQWA-NAUT program

TITLE Line — Prescribes a title for the run

OPTIONS Line

END	-	Mandatory code, to indicate the end of the options. No actual options are required

8.2.1 Coordinates

This deck prescribes the coordinates used in describing the model of vessel, and the tether attachment and anchor points.

Node	Explanation
1-142	The coordinates of the end of the tube describing the vessel
999	The coordinates of the centre of gravity
101-401	The coordinates of the tethers. Three coordinates at each point are automatically generated, at equal distances of 88.468 metres.
1010-40	The tether attachment points on the vessel.
9010-40	The tether anchor points on the seabed.

8.2.2 Element Topology

The PMAS element describes the mass and inertia of the vessel. The 16 TUBE elements constitute the hydrostatic and hydrodynamic model.

8.2.3 Material Properties

Group	Element	Mass/Density	Young's Modulus	Description
1	PMAS	268.8E3		The mass of the vessel
2	TUBE	1.0E-10		Nominal small density (vessel)
101	TUBE	7.817	2.15E8	For the tethers

8.2.4 Geometric Properties

Group 1 (PMAS) gives the Ixx, Iyy and Izz inertias of the vessel, which are 1.0339E9, 0.9529E9 and 0.7349E9.

The properties of the TUBE elements are as follows:

Group	Diameter	Thickness	Drag Coeff	Added Mass Coeff	Description
2	31.10	0.1000	0.75	1.00	Vessel legs
3	13.00	0.1000	0.75	1.48	Bottom buoyancy tank
101	1.1176	0.0380	0.75	1.00	Tether elements

Note that the thickness is nominal, as we are using the point mass to describe the mass and inertia of the vessel.

8.2.5 Global Environment

The depth of water (345m), the density of seawater (1.025 tonnes/m^3) and the acceleration due to gravity (9.81 m/s^2) are input.

8.2.6 Frequencies/Directions

No data is required for Deck 6 because, for long wavelengths, the vessel may be considered as non-diffracting - to a good approximation.

8.2.7-12 No data is required for Decks 7 to 12

Input NONE for the Deck Headers.

8.2.13 Regular Wave Description

WAMP - A wave amplitude of 15 metres is specified

PERD - A wave period of 15 seconds is specified

WVDN - A wave direction of 0 is specified, i.e. along the positive X-axis (FRA)

8.2.14 The Tether Element Topology and Parameters

TSLK - Specifies that listing file output is only required as specified by the TPRV card in Deck 18

TEIG - Specifies an eigenvalue solution is required before the main analysis, with 16 modes (all modes for this example) to be printed. Note that four modes will be trivial as two freedoms at the top of the tether and two freedoms at the bottom have boundary conditions of zero motion

TELM - The tether element topology, the first two columns refer to the nodes in Deck 1, the third to the material properties specified in Deck 3, and the fourth to the geometric properties specified in Deck 4

TEGR - Specifies that there are four identical tethers in this group. All forces on the vessel exerted by this tether are therefore multiplied by 4

TCAP - Specifies that there are no end caps, i.e. the hydrostatic axial forces at the top and bottom of the tether are equal to the hydrostatic pressure multiplied by the total cross-sectional area of the tether

TIMP - Specifies that the axial stress due to impact is initially 3.0E5 multiplied by the closing velocity. As the axial shock wave is assumed to travel to the top and return in a short time, all axial stresses in the tether will be assumed to be increased by this amount. This stress is assumed to decay exponentially. The half life is specified as 2.5 seconds, i.e. the axial stress due to impact will be half the initial value at 2.5 seconds

TLOW - This is the position of the lower stop below the anchor, and is specified as a nominal large value, as there is no lower stop in this example

TSPV - Specifies that the stiffness of both rotational springs at the vessel attachment points is 5729.6kN metres/radian

TSPA - Specifies that the stiffeners of both rotational springs at the anchor attachment points is 5729.6kN metres/radian

TETH - The tether card specifies that the input for Tether 1 is complete. The parameters 1 1010 0 9010 specify that the tether is connected to the vessel (Structure 1) at Node 1040 and is fixed (Structure 0) at Node 9010

TLAC - Tether fixed LAteral Constraint

TROC - Tether fixed ROtational Constraint

TLAV - Tether LAteral Vessel constraint (passes through ‘gap’ in structure)

TROV - Tether ROtational Vessel constraint (encastre condition on vessel)

The above cards (excluding the general TSLK and TEIG cards) are then repeated for each tether group with the TETH card specifying the other three corners of the vessel. In general, the four tether groups may not be identical and all four set will be input as above. However, in the example shown, the TELM-TSPA cards are identical for each tether group, and could be omitted. The program would then assume that the tethers were identical, and automatically generate the appropriate data.

8.2.15 Structure/Vessel Initial Conditions

POS1 - The initial position of the vessel centre of gravity is specified as -46.0 metres in surge (X-FRA direction) and -17.4 metres in heave

VEL1 - The initial velocity of the vessel centre of gravity is specified as zero

8.2.16 Time Integration Parameters

TIME - The time simulation requested is 101 steps of 0.25 seconds starting at time zero

8.2.17 No data is required for Deck 17

8.2.18 Program Output Options

PREV - Printing of the structure motions and forces is requested at every 10 steps (2.5 seconds)

PTEN - Printing of mooring (including tethers) tensions is requested

NODE - The printing of the position of Node 112 on Structure 1 is requested, in addition to the motions and forces

NOPR - As certain parameters are not required for this analysis, they have been switched off (NOPR= NO PRinting). These are parameters 4-6,15-17,19,23,25 and 29 which are RAO based position (not applicable to large waves), gyroscopic/linear diffraction/ linear damping force, hydrodynamic force, wave frequency force

PRNT - Mooring forces are required to be printed

8.2.19-20 No data is required for Decks 19 to 20

Input NONE for the Deck Headers.

8.2.21 Output from the Installed Tether Motion Simulation Run

As the output is similar to that of towed tethers, the description that follows and the selection of the listing file output shows the main differences in the output for towed and installed tethers.

As with the towed tether, the results consist of a data echo, a data listing, and a time history but instead of statistics output there is a harmonic analysis of the motions of the vessel. Note that for AQWA-DRIFT a fatigue analysis is not performed for installed tethers at present.

Data Listing

The section entitled 'Description of Tension Leg Tether' is output for each tether. The parameters output for Tether 1 are discussed below.

The position of the anchor and attachment points are shown (a) as originally defined (FRA) and (b) in the initial position at the start of the simulation. In this example, the tether initial position is sloping by some 10 degrees, as the initial position of the vessel is specified with -46.0 metres surge. The stretched and unstretched lengths show that initially Tether 1 is stretched by 265.599-265.406 = 0.193 metres and, as the end caps area are zero, the free hanging reaction is virtually zero.

The internal fluid specification was omitted and hence is output as zero.

The impact coefficients and half life are echoed as input.

Finally the tether group factor is echoed which, in this example, is 4.

Eigensolution Output

The eigensolution shows that the fundamental natural period is 4.99 seconds. Note that all the eigenvector/values correspond to the **initial tension for the specified position of the structure**. In this example, the initial tension is about 2000 tonnes, and the eigenvectors/values reflect this.

Time History Output

At 6.5 seconds, Tethers 1 and 2 become slack (only Tether 1 messages shown) and the message:

```
∗∗∗ ANALYSIS WARNING ∗∗∗  TETHER NUMBER 1 ON STRUCTURE 1 AT
                          TIME = 6.5 SECONDS HAS BECOME SLACK
```

is issued. The printing of the motions and forces for the tether is automatically switched on.

The next message is:

```
∗∗∗ ANALYSIS WARNING ∗∗∗  TETHER NUMBER  1 ON STRUCTURE  1 AT
                          TIME = 7.5 SECONDS HAS IMPACTED ON THE
                          UPPER ANCHOR CONSTRAINT
```

and this message is issued when the tether is again in tension. The impact velocity is then output at the point of impact.

```
IMPACT VELOCITY = 0.25 CAUSING AN INITIAL AXIAL STRESS = 7.558E+04
```

Tether printout then ceases (as a small time was specified on the TSLK card). and the structure motions and forces continue to be printed.

Finally the harmonic analysis of the motion of the structure is printed. This was processed from the last 15 seconds (one wave period) of the simulation. This is not directly applicable to simulation which have slack tethers but is extremely useful for insight into the motions when a quasi steady state has been reached. The output shows that approximately 97% of the surge motion and 93% of the heave motion is first order, whereas the very small pitch motion has approximately equal components of first, second and third order motion.

Graphics

Two plots, one of the "Motion Through a Wave Cycle" and another showing the "Wall Tensions and Stress" in the tether may be found in Appendix C.

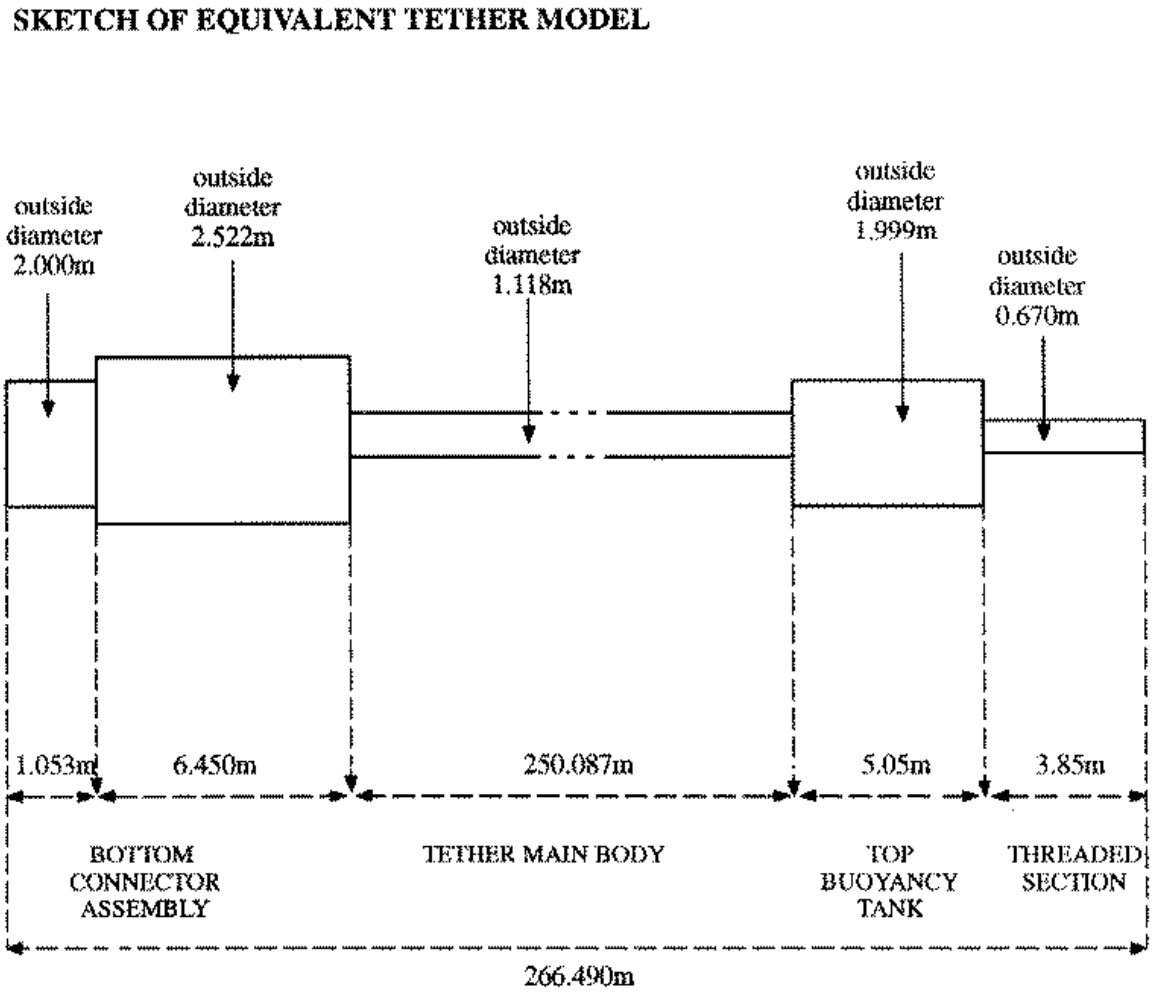

Figure 8.1 - Towed Tether Model

```
JOB HE01  DRIF  WFRQ
TITLE              Tether tow
OPTIONS LSTF NOST PRCE END
    01    COOR
    01   1              0.000       0.0       0.0
    01   2              1.053       0.0       0.0
    01   3   10    1     7.503       0.0       0.0    27.787
    01  13            262.636       0.0       0.0
    01  14            266.486       0.0       0.0
    01 100           -266.486       0.0      -0.5
 END01 999
    02    ELM1
 END02PMAS         1(1)(999)(999)(999)
    02    FINI
    03    MATE
    03             1  7.850263    2.00E5
    03             2  7.850263   13.50E6
    03             3  7.816940    2.15E8
    03             4  7.751645   13.50E6
    03             5  7.751645   13.50E6
 END03           999    1.0E10
    04    GEOM
    04TUBE         1     2.000   0.84010       0.0     0.000     0.000
    04CONT                0.75       1.0
    04TUBE         2    2.5822   0.01010       0.0     0.000     0.000
    04CONT                0.75       1.0
    04TUBE         3    1.1176   0.03800       0.0     0.000     0.000
    04CONT                0.75       1.0
    04TUBE         4    1.9993   0.03890       0.0     0.000     0.000
    04CONT                0.75       1.0
    04TUBE         5     0.670   0.10650       0.0     0.000     0.000
    04CONT                0.75       1.0
 END04PMAS       999 1.0698E12       0.0       0.0 9.2809E12       0.0 7.1578E12
    05    GLOB
    05DPTH   345.00
    05DENS    1.027
 END05ACCG    9.810
    06    NONE
    07    WFS1
    07LSTF         1
    07LSTF         2
    07LSTF         3                          1.0E10
    07LSTF         4                                    1.0E10
    07LSTF         5                                              1.0E10
    07LSTF         6
    07BFEQ             9.81E10
 END07ZCGE                -0.5
    08    NONE
    09    NONE
    10    NONE
    11    NONE
    12    NONE
    13    SPEC
    13NSPL        50
    13SPDN              180.0
 END13JONS              0.370       2.5    5.2273   0.01146    0.6411
```

Figure 8.2 - Example Data File for Towed Tether

```
    14    MOOR
    14TELM    1    2    1    1
    14TELM    2    3    2    2
    14TELM    3    4    3    3
    14TELM    4    5    3    3
    14TELM    5    6    3    3
    14TELM    6    7    3    3
    14TELM    7    8    3    3
    14TELM    8    9    3    3
    14TELM    9   10    3    3
    14TELM   10   11    3    3
    14TELM   11   12    3    3
    14TELM   12   13    4    4
    14TELM   13   14    5    5
    14TSLK
    14TCAP                          0.0       0.0
    14TIMP                        100.0     100.0
    14TLOW                        100.0
    14TSPV    1                     0.5       0.5       0.5
    14TSPA    1                     0.5       0.5       0.5
    14TEIG    6
END14TETH    1  999    0  100
    15    STRT
    15POS1              0.000     0.000    -0.500     0.000     0.000       0.0
END15VEL1               0.000     0.000     0.000     0.000     0.000       0.0
    16    TINT
END16TIME      1501      0.25
    17    HYDC
END17SLMM    1           1.00
    18    PROP
    18PREV  500
    18TGRV    2
    18TPRV  500
    18TSTS  100
    18TSTF 1501
    18PTEN    1
    18NOPR    1    4
    18NOPR    1    5
    18NOPR    1    6
    18NOPR    1    7
    18NOPR    1    8
    18NOPR    1    9
    18NOPR    1   10
    18NOPR    1   11
    18NOPR    1   12
    18NOPR    1   17
    18NOPR    1   19
    18NOPR    1   20
    18NOPR    1   25
    18NOPR    1   26
    18NOPR    1   27
    18NOPR    1   28
    18NOPR    1   29
    18NOPR    1   30
END18NOPR    1   31
    19    NONE
    20    NONE
```

Figure 8.2 - Example Data File for Towed Tether cont/d

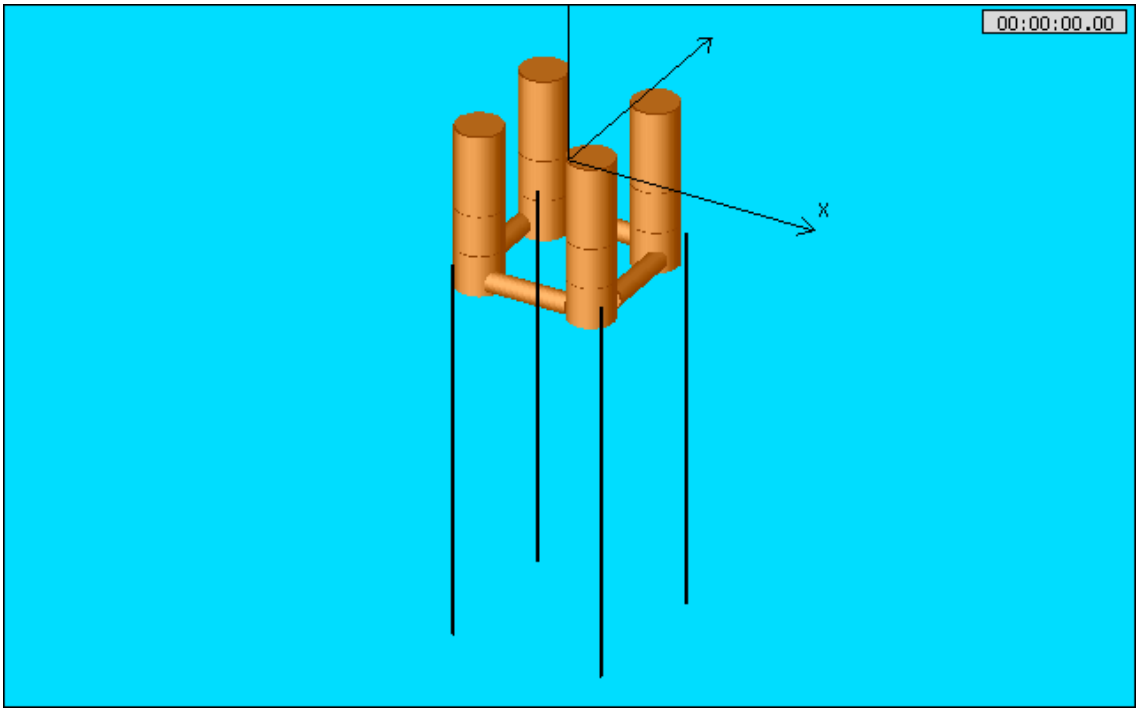

Figure 8.3 - Installed Tether Model

```
JOB MINT  NAUT
TITLE               Simple Tether Model - Tubes and Tethers
OPTIONS END
    01    COOR
    01  11    5    1      40.0      40.0     0.000     0.000     0.000     28.50
    01  19                41.0      40.0     0.000
    01  21    5    1     -40.0      40.0     0.000     0.000     0.000     28.50
    01  29                -41.0      40.0     0.000
    01  31    5    1     -40.0     -40.0     0.000     0.000     0.000     28.50
    01  39                -41.0     -40.0     0.000
    01  41    5    1      40.0     -40.0     0.000     0.000     0.000     28.50
    01  49                41.0     -40.0     0.000
    01  51             -28.3377     47.43     8.124
    01  52              28.3377     47.43     8.124
    01  59             -28.3377     47.43     9.124
    01  61               -47.43  -28.3377     8.124
    01  62               -47.43   28.3377     8.124
    01  69               -47.43  -28.3377     9.124
    01  71             -28.3377    -47.43     8.124
    01  72              28.3377    -47.43     8.124
    01  79             -28.3377    -47.43     9.124
    01  81                47.43  -28.3377     8.124
    01  82                47.43   28.3377     8.124
    01  89                47.43  -28.3377     9.124
    01 111                52.73     52.73  -329.730
    01 112                52.73     52.73    12.850
    01 121               -52.73     52.73  -329.730
    01 122               -52.73     52.73    12.850
    01 131               -52.73    -52.73  -329.730
    01 132               -52.73    -52.73    12.850
    01 141                52.73    -52.73  -329.730
    01 142                52.73    -52.73    12.850
    01 999                  0.0       0.0    63.600
    01 101    4    1   -52.630    52.630   -64.150                    -88.4685
    01 201    4    1   -52.630   -52.630   -64.150                    -88.4685
    01 301    4    1    52.630   -52.630   -64.150                    -88.4685
    01 401    4    1    52.630    52.630   -64.150                    -88.4685
    011010              -52.630    52.630    12.850
    011020              -52.630   -52.630    12.850
    011030               52.630   -52.630    12.850
    011040               52.630    52.630    12.850
    019010              -52.630    52.630-329.73543
    019020              -52.630   -52.630-329.73543
    019030               52.630   -52.630-329.73543
 END019040               52.630    52.630-329.73543
    02    ELM1
    02PMAS          (1)(999)(1)(1)
    02TUBE          (2)(11,1)(12,1)(2)(2)
    02TUBE          (1)(13  )(15  )(2)(2)
    02TUBE          (2)(21,1)(22,1)(2)(2)
    02TUBE          (1)(23  )(25  )(2)(2)
    02TUBE          (2)(31,1)(32,1)(2)(2)
    02TUBE          (1)(33  )(35  )(2)(2)
    02TUBE          (2)(41,1)(42,1)(2)(2)
    02TUBE          (1)(43  )(45  )(2)(2)
    02TUBE          (1)(51)(52)(2)(3)
    02TUBE          (1)(61)(62)(2)(3)
    02TUBE          (1)(71)(72)(2)(3)
 END02TUBE          (1)(81)(82)(2)(3)
```

Figure 8.4 Installed Tether Example

Figure 8.4 Installed Tether Example cont/d

```
   02    FINI
   03    MATE
   03              1   268.8E3
   03              2   1.0E-10
END03            101   7.81694    2.15E8
   04    GEOM
   04PMAS          1  1.0339E9       0.0       0.0  0.9529E9       0.0  0.7349E9
   04TUBE          2      31.1       0.1   0.00000     0.000     0.000
   04CONT                 0.75       1.0
   04TUBE          3     13.00       0.1   0.00000     0.000     0.000
   04CONT                 0.75      1.48
   04TUBE        101    1.1176   0.03800       0.0     0.000     0.000
END04CONT                 0.75       1.0
   05    GLOB
   05DPTH   345.00
   05DENS    1.025
END05ACCG    9.810
   06    NONE
   07    NONE
   08    NONE
   09    NONE
   10    NONE
   11    NONE
   12    NONE
   13    WAVE
   13WAMP                15.00
   13PERD                15.00
END13WVDN                 0.00
   14    MOOR
   14TSLK                          0.001
   14TEIG   16
   14TELM  104  103  101  101
   14TELM  103  102  101  101
   14TELM  102  101  101  101
   14TEGR    4
   14TCAP                            0.0       0.0
   14TIMP                       300000.0       2.5
   14TLOW                          100.0
   14TSPV                            0.0  5729.578  5729.578
   14TSPA                            0.0  5729.578  5729.578
   14TETH    1 1010    0 9010
   14TELM  204  203  101  101
   14TELM  203  202  101  101
   14TELM  202  201  101  101
   14TEGR    4
   14TCAP                            0.0       0.0
   14TIMP                       300000.0       2.5
   14TLOW                          100.0
   14TSPV                            0.0  5729.578  5729.578
   14TSPA                            0.0  5729.578  5729.578
   14TETH    1 1020    0 9020
   14TELM  304  303  101  101
   14TELM  303  302  101  101
   14TELM  302  301  101  101
   14TEGR    4
   14TCAP                            0.0       0.0
   14TIMP                       300000.0       2.5
   14TLOW                          100.0
   14TSPV                            0.0  5729.578  5729.578
   14TSPA                            0.0  5729.578  5729.578
   14TETH    1 1030    0 9030
   14TELM  404  403  101  101
   14TELM  403  402  101  101
   14TELM  402  401  101  101
   14TEGR    4
```

```
   14TCAP                          0.0       0.0
   14TIMP                     300000.0       2.5
   14TLOW                        100.0
   14TSPV                          0.0  5729.578  5729.578
   14TSPA                          0.0  5729.578  5729.578
END14TETH    1 1040    0 9040
   15    STRT
   15POS1              -46.000     0.000   -17.400     0.000     0.000       0.0
END15VEL1                0.000     0.000     0.000     0.000     0.000       0.0       0.0
   16    TINT
END16TIME       101     0.250     0.000
   17    NONE
   18    PROP
   18PREV   10
   18TGRV    2
   18PTEN    1
   18NODE    1  112
   18NOPR    1    4
   18NOPR    1    5
   18NOPR    1    6
   18NOPR    1   15
   18NOPR    1   16
   18NOPR    1   17
   18NOPR    1   19
   18NOPR    1   23
   18NOPR    1   25
END18PRNT    1   49
   19    NONE
   20    NONE
```

Figure 8.4 Installed Tether Example cont/d

TOWED TETHER EXAMPLE - SELECTED OUTPUT LISTING

```
JOB HE01  DRIF  WFRQ

 TITLE               Tether tow

 OPTIONS LSTF NOST PRCE END


 AQWA-DRIFT   VERSION 5.4A 17-JUL-03
```

```
  AAAAAA    QQQQQQ   WW      WW   AAAAAA         DDDDDDD    RRRRRR    IIII   FFFFFFFF   TTTTTTTT
 AAAAAAAA  QQQQQQQQ  WW      WW  AAAAAAAA        DDDDDDDD  RRRRRRRR   IIII   FFFFFFFF  TTTTTTTTTT
 AA    AA  QQ    QQ  WW      WW  AA    AA        DD    DD  RR    RR    II    FF            TT
 AA    AA  QQ    QQ  WW      WW  AA    AA        DD    DD  RR    RR    II    FF            TT
 AAAAAAAA  QQ    QQ  WW      WW  AAAAAAAA  IIII  DD    DD  RRRRRRRR    II    FFFFF         TT
 AAAAAAAA  QQ    QQ  WW  WW  WW  AAAAAAAA  IIII  DD    DD  RRRRRRRR    II    FFFFF         TT
 AA    AA  QQ    QQ  WW  WW  WW  AA    AA        DD    DD  RRRRR       II    FF            TT
 AA    AA  QQ QQ QQ  WW  WW  WW  AA    AA        DD    DD  RR RRR      II    FF            TT
 AA    AA  QQQQQQQQ  WWWWWWWWWW  AA    AA        DDDDDDDD  RR  RRR    IIII   FF          TTTT
 AA    AA   QQQQQQ    WWWWWWWW   AA    AA        DDDDDDD   RR   RRR   IIII   FF          TTTT
             QQ
```

THE DEVELOPMENT OF THE AQWA SUITE IS NOW CONDUCTED BY CENTURY DYNAMICS LIMITED WHO ARE CONTINUALLY IMPROVING THE CAPABILITIES OF THE HYDRODYNAMIC CALCULATIONS AS MORE ADVANCED TECHNIQUES BECOME AVAILABLE. SUGGESTIONS FROM USERS REGARDING DEVELOPMENT WILL BE WELCOMED.

CENTURY DYNAMICS LIMITED
DYNAMICS HOUSE
HURST ROAD
HORSHAM
WEST SUSSEX RH12 2DT
ENGLAND

JOB TITLE : Tether tow

```
   DECK  1
   -------

   01   1    0    0     0.000     0.000     0.000     0.000     0.000     0.000
   01   2    0    0     1.053     0.000     0.000     0.000     0.000     0.000
   01   3   10    1     7.503     0.000     0.000    27.787     0.000     0.000
   01  13    0    0   262.636     0.000     0.000     0.000     0.000     0.000
   01  14    0    0   266.486     0.000     0.000     0.000     0.000     0.000
   01 100    0    0  -266.486     0.000    -0.500     0.000     0.000     0.000
END01 999    0    0     0.000     0.000     0.000     0.000     0.000     0.000

   DECK  2
   -------

END02PMAS         1(1)(999)(999)(999)

   DECK  2
   -------


   DECK  3
   -------

   03             1 7.850E+00 2.000E+05 0.000E+00
   03             2 7.850E+00 1.350E+07 0.000E+00
   03             3 7.817E+00 2.150E+08 0.000E+00
   03             4 7.752E+00 1.350E+07 0.000E+00
   03             5 7.752E+00 1.350E+07 0.000E+00
END03           999 1.000E+10 0.000E+00 0.000E+00

   DECK  4
   -------

   04TUBE         1 2.000E+00 8.401E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04CONT         0 7.500E-01 1.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04TUBE         2 2.582E+00 1.010E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04CONT         0 7.500E-01 1.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04TUBE         3 1.118E+00 3.800E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04CONT         0 7.500E-01 1.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04TUBE         4 1.999E+00 3.890E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04CONT         0 7.500E-01 1.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04TUBE         5 6.700E-01 1.065E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00
   04CONT         0 7.500E-01 1.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
END04PMAS       999 1.070E+12 0.000E+00 0.000E+00 9.281E+12 0.000E+00 7.158E+12

   DECK  5
   -------
   05DPTH    345.00      0.00      0.00      0.00      0.00      0.00
   05DENS      1.03      0.00      0.00      0.00      0.00      0.00
END05ACCG      9.81      0.00      0.00      0.00      0.00      0.00
```

* * * * C O O R D I N A T E D A T A * * * *
- - - - - - - - - - - - - - - - -

INPUT SEQUENCE	NODE NO.	X	Y	Z
1	1	0.000	0.000	0.000
2	2	1.053	0.000	0.000
3	3	7.503	0.000	0.000
4	4	35.290	0.000	0.000
5	5	63.077	0.000	0.000
6	6	90.864	0.000	0.000
7	7	118.651	0.000	0.000
8	8	146.438	0.000	0.000
9	9	174.225	0.000	0.000
10	10	202.012	0.000	0.000
11	11	229.799	0.000	0.000
12	12	257.586	0.000	0.000
13	13	262.636	0.000	0.000
14	14	266.486	0.000	0.000
15	100	-266.486	0.000	-0.500
16	999	0.000	0.000	0.000

* * * * E L E M E N T T O P O L O G Y F O R S T R U C T U R E 1 * * * *

E L E M E N T NUMBER	TYPE	NODE NUMBER	NODE NUMBER	NODE NUMBER	NODE NUMBER	MATERIAL NUMBER	GEOMETRY NUMBER
1	PMAS	999	0	0	0	999	999

* * * * M A T E R I A L P R O P E R T I E S * * * *
- - - - - - - - - - - - - - - - - - -

MATERIAL GROUP NUMBER	DENSITY/PARAM 1	PARAM 2	PARAM 3
1	7.8503E+00	2.0000E+05	0.0000E+00
2	7.8503E+00	1.3500E+07	0.0000E+00
3	7.8169E+00	2.1500E+08	0.0000E+00
4	7.7516E+00	1.3500E+07	0.0000E+00
5	7.7516E+00	1.3500E+07	0.0000E+00
999	1.0000E+10	0.0000E+00	0.0000E+00

* * * * G E O M E T R I C P R O P E R T I E S * * * *
- -

INPUT SEQUENCE	GEOMETRY GROUP NO.	ELEMENT TYPE	G E O M E T R I C P A R A M E T E R N U M B E R 1	2	3	4	5	6	DRAG COEFFICIENT C D	ADDED MASS COEFFICIENT C M
1	1	TUBE	2.000	0.840100	0.000	0.000	0.000		0.75	1.00
2	2	TUBE	2.582	0.010100	0.000	0.000	0.000		0.75	1.00
3	3	TUBE	1.118	0.038000	0.000	0.000	0.000		0.75	1.00
4	4	TUBE	1.999	0.038900	0.000	0.000	0.000		0.75	1.00
5	5	TUBE	0.670	0.106500	0.000	0.000	0.000		0.75	1.00
6	999	PMAS	1.0698E+12	0.0000E+00	0.0000E+00	9.2809E+12	0.0000E+00	7.1578E+12	0.00	0.00

```
    * * * *  G L O B A L   P A R A M E T E R S  * * * *
             - - - - - - - - - - - - - - - - -

WATER  DEPTH  . . . . . . . . . . . . . . . .  =   345.000

DENSITY  OF  WATER  . . . . . . . . . . . . .  =     1.027

ACCELERATION  DUE  TO GRAVITY . . . . . . . .  =     9.810
```

* * * * * * * * * MASS AND INERTIA PROPERTIES OF STRUCTURE 1 * * * * * * * * *

ELEMENT TYPE	NUMBER OF ELEMENTS	MASS	WEIGHT
PMAS	1	1.0000E+10	9.8100E+10
T O T A L	1	1.0000E+10	9.8100E+10

	X	Y	Z
CENTRE OF GRAVITY	0.000	0.000	0.000
INERTIA MATRIX	1.070E+12	0.000E+00	0.000E+00
	0.000E+00	9.281E+12	0.000E+00
	0.000E+00	0.000E+00	7.158E+12

```
    DECK  6.1
    ---------

    DECK  7.1
    ---------

    07LSTF    0    1  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
    07LSTF    0    2  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
    07LSTF    0    3  0.00E+00  0.00E+00  1.00E+10  0.00E+00  0.00E+00  0.00E+00
    07LSTF    0    4  0.00E+00  0.00E+00  0.00E+00  1.00E+10  0.00E+00  0.00E+00
    07LSTF    0    5  0.00E+00  0.00E+00  0.00E+00  0.00E+00  1.00E+10  0.00E+00
    07LSTF    0    6  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
    07BFEQ    0    0  9.81E+10  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00
END07ZCGE     0    0 -5.00E-01  0.00E+00  0.00E+00  0.00E+00  0.00E+00  0.00E+00

    DECK  8.1
    ---------
```

```
   * * * * W A V E   F R E Q U E N C I E S / P E R I O D S   A N D   D I R E C T I O N S * * * *
            - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-------------------------------------------------------------------------------------------------
STRUCTURE     FREQUENCY FREQUENCY  PERIOD     WAVE    WAVE   MAX ELEM    DEPTH RATIO      PARAMETERS
              (RAD/SEC)  (HERTZ)  (SECONDS)  NUMBER  LENGTH    SIZE      D/L      K*D
-------------------------------------------------------------------------------------------------
          FREQUENCIES *UNDEFINED*
          ---------------------------------------------------------------------------------------
      1     DIRECTIONS  *UNDEFINED*
-------------------------------------------------------------------------------------------------
```

* * * * H Y D R O D Y N A M I C P A R A M E T E R S F O R S T R U C T U R E 1 * * * *

AT THE FREE-FLOATING EQUILIBRIUM POSITION

BUOYANCY FORCE . . . . . = 9.8100E+10

Z POSITION OF THE CENTRE OF GRAVITY . = -5.0000E-01

STIFFNESS MATRIX

	X	Y	Z	RX	RY	RZ
X	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Y	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Z	0.0000E+00	0.0000E+00	1.0000E+10	0.0000E+00	0.0000E+00	0.0000E+00
RX	0.0000E+00	0.0000E+00	0.0000E+00	1.0000E+10	0.0000E+00	0.0000E+00
RY	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0000E+10	0.0000E+00
RZ	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

```
DECK  9
-------


DECK 10.1
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DECK 11
-------


DECK 12
-------


DECK 13
-------

    13NSPL    0   50     0.000     0.000     0.000     0.000     0.000     0.000
    13SPDN    0    0   180.000     0.000     0.000     0.000     0.000     0.000
 END13JONS    0    0     0.370     2.500     5.227     0.011     0.641     0.000

DECK 14
-------

    14TELM    1    2    1    1 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    2    3    2    2 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    3    4    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    4    5    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    5    6    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    6    7    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    7    8    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    8    9    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM    9   10    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM   10   11    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM   11   12    3    3 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM   12   13    4    4 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM   13   14    5    5 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TSLK    0    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TCAP    0    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TIMP    0    0    0    0 1.000E+02 1.000E+02 0.000E+00 0.000E+00 0.000E+00
    14TLOW    0    0    0    0 1.000E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TSPV    1    0    0    0 5.000E-01 5.000E-01 5.000E-01 0.000E+00 0.000E+00
    14TSPA    1    0    0    0 5.000E-01 5.000E-01 5.000E-01 0.000E+00 0.000E+00
    14TEIG    6    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 END14TETH    1  999    0  100 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

DECK 15
-------

    15POS1               0.000     0.000    -0.500     0.000     0.000     0.000
 END15VEL1               0.000     0.000     0.000     0.000     0.000     0.000

DECK 16
-------
```

```
 END16TIME    0 1501     0.250     0.000     0.000     0.000     0.000     0.000

DECK 17
-------

 END17SLMM    1    0        1.        0.        0.        0.        0.        0.

DECK 18
-------

    18PREV  500
    18TGRV    2
    18TPRV  500
    18TSTS  100
    18TSTF 1501
    18PTEN    1
    18NOPR    1    4
    18NOPR    1    5
    18NOPR    1    6
    18NOPR    1    7
    18NOPR    1    8
    18NOPR    1    9
    18NOPR    1   10
    18NOPR    1   11
    18NOPR    1   12
    18NOPR    1   17
    18NOPR    1   19
    18NOPR    1   20
    18NOPR    1   25
    18NOPR    1   26
    18NOPR    1   27
    18NOPR    1   28
    18NOPR    1   29
    18NOPR    1   30
 END18NOPR    1   31

DECK 19
-------

DECK 20
-------
```

*** * * * H Y D R O D Y N A M I C P A R A M E T E R S F O R S T R U C T U R E 1 * * * ***

ADDED MASS AT DRIFT FREQUENCY

	X	Y	Z	RX	RY	RZ
X	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Y	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Z	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RX	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RY	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RZ	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

DAMPING AT DRIFT FREQUENCY

	X	Y	Z	RX	RY	RZ
X	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Y	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Z	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RX	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RY	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RZ	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**** WIND/CURRENT LOADS FOR UNIT AMPLITUDE/VELOCITY ****
**** AND THRUSTER FORCES FOR STRUCTURE 1 ****

NO THRUSTER FORCES

*** * * * C O N S T R A I N T S * * * ***

STRUCTURE NUMBER	ACTIVE FREEDOMS TABLE X	Y	Z	RX	RY	RZ
1	X	X	X	X	X	X

```
      * * * * S P E C T R A L   P A R A M E T E R S * * * *
            - - - - - - - - - - - - - - - - - - -

TYPE OF WAVE SPECTRUM . . . . . . . . . . . . =    JONSWAP

LOWER FREQUENCY LIMIT . . . . . . . . . . . . =    0.370

UPPER FREQUENCY LIMIT . . . . . . . . . . . . =    2.500

GAMMA . . . . . . . . . . . . . . . . . . . . =    5.227

ALPHA . . . . . . . . . . . . . . . . . . . . =    0.01146

PEAK FREQUENCY. . . . . . . . . . . . . . . . =    0.641

SIGNIFICANT WAVE HEIGHT . . . . . . . . . . . =    6.302

NUMBER OF WAVE SPECTRAL LINES . . . . . . . . =    50

NUMBER OF RASTERS . . . . . . . . . . . . . . =    5000

SPECTRAL DIRECTION  . . . . . . . . . . . . . =    180.00

TETHER TOWING SPEED . . . . . . . . . . . . . =    0.00

TETHER STEADY OFFSET  . . . . . . . . . . . . =    0.00

WIND SPEED  . . . . . . . . . . . . . . . . . =    0.00

WIND DIRECTION  . . . . . . . . . . . . . . . =    0.00

WIND REFERENCE HEIGHT . . . . . . . . . . . . =    0.00

WIND SPECTRUM TYPE  . . . . . . . . . . . . . =    NONE

NUMBER OF WIND SPECTRAL LINES . . . . . . . . =    0

RANDOM NUMBER SEED(IF APPLICABLE) . . . . . . =    1
```

PROGRAM AQWA-DRIF JOB CODE-HE01 TITLE-Tether tow

**** DESCRIPTION OF TENSION LEG TETHER 1****

TETHER NODE	ELEVATION	NODE 1	NODE 2	MATE GROUP	GEOM GROUP	X-SECT AREA	2ND-MOM OF AREA	EI	EA	CAP AREA	EXTERNAL DIAM	AREA. INLINE/ VERTICAL	X ROT COIL	Y ROT COIL
14	266.5									0.000		5.00E-01	0.00E+00	0.00E+00
		13	14	5	5	0.1885	0.007751	1.046E+05	2.545E+06		0.353			
13	262.6													
		12	13	4	4	0.2396	0.115137	1.554E+06	3.234E+06		3.139			
12	257.6													
		11	12	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
11	229.8													
		10	11	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
10	202.0													
		9	10	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
9	174.2													
		8	9	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
8	146.4													
		7	8	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
7	118.7													
		6	7	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
6	90.9													
		5	6	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
5	63.1													
		4	5	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
4	35.3													
		3	4	3	3	0.1289	0.018801	4.042E+06	2.771E+07		0.981			
3	7.5													
		2	3	2	2	0.0816	0.067492	9.111E+05	1.102E+06		5.237			
2	1.1													
		1	2	1	1	3.0613	0.784885	1.570E+05	6.123E+05		3.142			
1	0.0									0.000		5.00E-01	0.00E+00	0.00E+00

TETHER CONFIGURATION- . . . . . = TOWED

VESSEL ATTACHMENT - NODE NUMBER . . . . . = 999
- POSITION IN FRA . . . . = 0.000 0.000 0.000
- INITIAL POSITION . . . = 0.000 0.000 -0.500

ANCHOR ATTACHMENT - AT NODE NUMBER . . . . = 100
- POSITION IN FRA . . . . = -266.486 0.000 -0.500
- STOP DIST BELOW ANCHOR. = 100.000

UNSTRETCHED LENGTH OF TETHER . . . . . = 266.486
INITIAL DISTANCE BETWEEN ANCHOR/ATTACHMENT. . = 266.486

```
LONGITUDAL STIFFNESS OF COMPLETE TETHER . . . = 5.000E-01

WEIGHT OF TETHER                               = 2.908E+03
BUOYANCY OF TETHER(EXCLUDING END CAP EFFECTS) =-3.019E+03
END CAP BUOYANCY    (TETHER ASSUMED VERTICAL) = 0.000E+00
FREE HANGING REACTION          (SUM OF ABOVE) =-1.111E+02

INTERNAL FLUID      - PRESSURE AT SEA LEVEL . = 0.000E+00
                    - DENSITY . . . . . . . . =     0.000

IMPACT COEFFICIENTS - AXIAL STRESS FACTOR . . = 1.000E+02
                      HALF LIFE (SECONDS) . . =   100.000

TETHER GROUP FACTOR(FACTOR FOR VESSEL FORCES  =         0
```

* * * * E I G E N S O L U T I O N M O D E 1 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 14

FREQUENCY (RAD/SEC) = 0.0402
FREQUENCY (HERTZ) = 0.0064

PERIOD (SECONDS) = 156.30

NODE	DISTANCE ALONG TETHER	VERT/HORIZONTAL DISPLACEMENT Y	Z	SLOPE (DEG) RY	RZ
14	266.49	0.0000	0.8461	0.0683	0.0000
13	262.64	0.0000	0.8506	0.0666	0.0000
12	257.59	0.0000	0.8565	0.0661	0.0000
11	229.80	0.0000	0.8879	0.0629	0.0000
10	202.01	0.0000	0.9170	0.0566	0.0000
9	174.23	0.0000	0.9425	0.0481	0.0000
8	146.44	0.0000	0.9634	0.0381	0.0000
7	118.65	0.0000	0.9794	0.0277	0.0000
6	90.86	0.0000	0.9904	0.0177	0.0000
5	63.08	0.0000	0.9968	0.0091	0.0000
4	35.29	0.0000	0.9996	0.0027	0.0000
3	7.50	0.0000	1.0000	-0.0004	0.0000
2	1.05	0.0000	0.9999	-0.0011	0.0000
1	0.00	0.0000	0.9999	-0.0012	0.0000

* * * * E I G E N S O L U T I O N M O D E 2 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 13

FREQUENCY (RAD/SEC) = 0.0410
FREQUENCY (HERTZ) = 0.0065

PERIOD (SECONDS) = 153.26

NODE	DISTANCE ALONG TETHER	VERT/HORIZONTAL DISPLACEMENT Y	Z	SLOPE (DEG) RY	RZ
14	266.49	0.8559	0.0000	0.0000	-0.0676
13	262.64	0.8604	0.0000	0.0000	-0.0658
12	257.59	0.8661	0.0000	0.0000	-0.0653
11	229.80	0.8971	0.0000	0.0000	-0.0619
10	202.01	0.9257	0.0000	0.0000	-0.0553
9	174.23	0.9504	0.0000	0.0000	-0.0462
8	146.44	0.9703	0.0000	0.0000	-0.0358
7	118.65	0.9850	0.0000	0.0000	-0.0248
6	90.86	0.9945	0.0000	0.0000	-0.0144
5	63.08	0.9992	0.0000	0.0000	-0.0053
4	35.29	1.0000	0.0000	0.0000	0.0014
3	7.50	0.9984	0.0000	0.0000	0.0046
2	1.05	0.9978	0.0000	0.0000	0.0054
1	0.00	0.9977	0.0000	0.0000	0.0055

* * * * E I G E N S O L U T I O N M O D E 3 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 22

FREQUENCY (RAD/SEC) = 0.0661
FREQUENCY (HERTZ) = 0.0105

PERIOD (SECONDS) = 95.03

NODE	DISTANCE ALONG TETHER	VERT/HORIZONTAL DISPLACEMENT Y	Z	SLOPE (DEG) RY	RZ
14	266.49	0.0000	1.0000	-0.3855	0.0000
13	262.64	0.0000	0.9741	-0.3875	0.0000
12	257.59	0.0000	0.9399	-0.3880	0.0000
11	229.80	0.0000	0.7511	-0.3911	0.0000
10	202.01	0.0000	0.5602	-0.3960	0.0000
9	174.23	0.0000	0.3669	-0.4010	0.0000
8	146.44	0.0000	0.1714	-0.4050	0.0000
7	118.65	0.0000	-0.0256	-0.4072	0.0000
6	90.86	0.0000	-0.2232	-0.4074	0.0000
5	63.08	0.0000	-0.4205	-0.4061	0.0000
4	35.29	0.0000	-0.6170	-0.4039	0.0000
3	7.50	0.0000	-0.8124	-0.4023	0.0000
2	1.05	0.0000	-0.8577	-0.4018	0.0000
1	0.00	0.0000	-0.8651	-0.4017	0.0000

* * * * E I G E N S O L U T I O N M O D E 4 - T E T H E R N U M B E R 1 * * * *

MODE FREEDOM POSN = 25

FREQUENCY (RAD/SEC) = 0.0680
FREQUENCY (HERTZ) = 0.0108

PERIOD (SECONDS) = 92.42

NODE	DISTANCE ALONG TETHER	VERT/HORIZONTAL DISPLACEMENT Y	Z	SLOPE (DEG) RY	RZ
14	266.49	1.0000	0.0000	0.0000	0.3876
13	262.64	0.9739	0.0000	0.0000	0.3896
12	257.59	0.9396	0.0000	0.0000	0.3901
11	229.80	0.7497	0.0000	0.0000	0.3934
10	202.01	0.5577	0.0000	0.0000	0.3985
9	174.23	0.3631	0.0000	0.0000	0.4038
8	146.44	0.1662	0.0000	0.0000	0.4078
7	118.65	-0.0322	0.0000	0.0000	0.4100
6	90.86	-0.2311	0.0000	0.0000	0.4102
5	63.08	-0.4297	0.0000	0.0000	0.4086
4	35.29	-0.6273	0.0000	0.0000	0.4063
3	7.50	-0.8239	0.0000	0.0000	0.4045
2	1.05	-0.8694	0.0000	0.0000	0.4039
1	0.00	-0.8768	0.0000	0.0000	0.4039

* * * * E I G E N S O L U T I O N M O D E 5 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 26

FREQUENCY (RAD/SEC) = 0.4097
FREQUENCY (HERTZ) = 0.0652

PERIOD (SECONDS) = 15.34

NODE	DISTANCE ALONG TETHER	VERT/HORIZONTAL DISPLACEMENT Y	Z	SLOPE (DEG) RY	RZ
14	266.49	0.0000	1.0000	-0.9853	0.0000
13	262.64	0.0000	0.9338	-0.9857	0.0000
12	257.59	0.0000	0.8469	-0.9849	0.0000
11	229.80	0.0000	0.3750	-0.9490	0.0000
10	202.01	0.0000	-0.0579	-0.8180	0.0000
9	174.23	0.0000	-0.4003	-0.5763	0.0000
8	146.44	0.0000	-0.6025	-0.2464	0.0000
7	118.65	0.0000	-0.6329	0.1227	0.0000
6	90.86	0.0000	-0.4869	0.4707	0.0000
5	63.08	0.0000	-0.1887	0.7429	0.0000
4	35.29	0.0000	0.2159	0.9062	0.0000
3	7.50	0.0000	0.6726	0.9619	0.0000
2	1.05	0.0000	0.7814	0.9681	0.0000
1	0.00	0.0000	0.7992	0.9683	0.0000

```
 * * * * E I G E N   S O L U T I O N   M O D E   6 - T E T H E R   N U M B E R   1 * * * *
       - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                          MODE FREEDOM POSN   = 21

                          FREQUENCY (RAD/SEC) =  0.4139
                          FREQUENCY (HERTZ)   =  0.0659

                          PERIOD    (SECONDS) =   15.18
```

NODE	DISTANCE ALONG TETHER	VERT/HORIZONTAL DISPLACEMENT Y	Z	SLOPE (DEG) RY	RZ
14	266.49	1.0000	0.0000	0.0000	0.9829
13	262.64	0.9339	0.0000	0.0000	0.9833
12	257.59	0.8473	0.0000	0.0000	0.9825
11	229.80	0.3764	0.0000	0.0000	0.9470
10	202.01	-0.0556	0.0000	0.0000	0.8162
9	174.23	-0.3970	0.0000	0.0000	0.5741
8	146.44	-0.5980	0.0000	0.0000	0.2433
7	118.65	-0.6266	0.0000	0.0000	-0.1267
6	90.86	-0.4786	0.0000	0.0000	-0.4750
5	63.08	-0.1785	0.0000	0.0000	-0.7464
4	35.29	0.2274	0.0000	0.0000	-0.9082
3	7.50	0.6849	0.0000	0.0000	-0.9630
2	1.05	0.7938	0.0000	0.0000	-0.9692
1	0.00	0.8116	0.0000	0.0000	-0.9694

```
*** COMMENT ***50 MODES>  1.141 RAD/SEC(PERIOD= 5.5079 SECS) NOT PRINTED
```

**** INITIAL POSITION AND VELOCITY OF THE ****
**** CENTRE OF GRAVITY ****

+
(S) = SLOW DRIFT MOTION, (T) = TOTAL MOTION (I.E. SLOW DRIFT AND WAVE FREQUENCY MOTION COMBINED)

STRUCTURE NUMBER	+ PARAMETER	TRANSLATIONS(FRA) X	Y	Z	ROTATIONS(FRA) RX	RY	RZ	DIRECTION COSINES X	Y	Z
1	POSITION(S)	0.000	0.000	-0.500	0.000	0.000	0.000	1.0000	0.0000	0.0000
								0.0000	1.0000	0.0000
								0.0000	0.0000	1.0000
1	VELOCITY(S)	0.000	0.000	0.000	0.000	0.000	0.000			
1	POSITION(T)	0.000	0.000	-0.500	0.000	0.000	0.000	1.0000	0.0000	0.0000
								0.0000	1.0000	0.0000
								0.0000	0.0000	1.0000
1	VELOCITY(T)	0.000	0.000	0.000	0.000	0.000	0.000			

* * * * T I M E I N T E G R A T I O N P A R A M E T E R S * * * *
- -

INTEGRATION SCHEME= TWO-STAGE PREDICTOR-CORRECTOR WITH THIRD ORDER ERRORS

STARTING RECORD NUMBER..... 1

NUMBER OF TIME STEPS..... 1501

PRESENT TIME STEP..... 0.250

PRESENT TIME..... 0.000

EXPECTED ERRORS FOR INTEGRATION OF SINUSOIDAL MOTION FOR TIME-STEP OF 0.2500

FREQUENCY (RAD/SEC)	PERIOD (SECONDS)	AMPLITUDE ERROR (PER CENT)	PHASE ERROR (DEGREES)
0.0200	314.16	0.0	0.0
0.0300	209.44	0.0	0.0
0.0500	125.66	0.0	0.0
0.0700	89.76	0.0	0.0
0.1000	62.83	0.0	0.0
0.1500	41.89	0.0	0.0
0.2000	31.42	0.0	0.0
0.3000	20.94	0.0	0.1
0.5000	12.57	0.0	0.2
0.7000	8.98	0.0	0.5
1.0000	6.28	0.1	0.9
1.5000	4.19	0.4	2.0
2.0000	3.14	0.9	3.4
5.0000	1.26	10+	10+

* * * * P A R A M E T E R S A F F E C T I N G H Y D R O D Y N A M I C * * * *
- -
* * * * M O R I S O N E L E M E N T F O R C E S * * * *
- -

MULTIPLYING FACTORS FOR HYDRODYNAMIC PARAMETERS

STRUCTURE	DRAG	ADDED MASS	SLAM
1	1.00	1.00	1.00

HYDRODYNAMIC ERROR LIMITS FOR SLAM AND DRAG ON TUBE ELEMENTS

SIGNIFICANT FROUDE NUMBER SQUARED	0.040
VELOCITY PROFILE RATIO	0.100
VELOCITY ALIGNMENT ANGLE	5.730

REYNOLDS NUMBER RELATED PARAMETERS

SCALE FACTOR	1.000
KINEMATIC VISCOSITY	1.570E-06
UNIT REYNOLDS NUMBER	6.369E+05

* * * * W A V E S P E C T R A L L I N E S * * * *
- - - - - - - - - - - - - - - - - - -

4 TIMES SQUARE ROOT OF RASTER AREA(S.W.H.) = 6.293

NUMBER	WAVE NUMBER	FREQUENCY	PHASE	ORDINATES
1	2.2979E-02	0.4748	0.0028	0.3699
2	2.7549E-02	0.5199	47.3536	1.6648
3	3.0199E-02	0.5443	272.0179	2.4415
4	3.2157E-02	0.5617	165.1140	3.3340
5	3.3655E-02	0.5746	191.7962	4.3979
6	3.4834E-02	0.5846	78.8253	5.5872
7	3.5794E-02	0.5926	16.9361	6.8348
8	3.6602E-02	0.5992	244.3913	8.0824
9	3.7303E-02	0.6049	244.5467	9.2850
10	3.7925E-02	0.6100	336.4894	10.4170
11	3.8490E-02	0.6145	138.0607	11.4527
12	3.9013E-02	0.6186	186.9899	12.3789
13	3.9502E-02	0.6225	299.1475	13.1857
14	3.9968E-02	0.6262	12.4460	13.8646
15	4.0416E-02	0.6297	19.2462	14.4123
16	4.0852E-02	0.6331	190.6921	14.8242
17	4.1280E-02	0.6364	241.6138	15.0971
18	4.1704E-02	0.6396	2.7713	15.2306
19	4.2129E-02	0.6429	138.0296	15.2344
20	4.2557E-02	0.6461	24.0632	15.1429
21	4.2991E-02	0.6494	150.2950	14.9648
22	4.3434E-02	0.6528	247.2382	14.7002

NUMBER	WAVE NUMBER	FREQUENCY	PHASE	ORDINATES
23	4.3888E-02	0.6562	212.0316	14.3502
24	4.4358E-02	0.6597	334.9571	13.9169
25	4.4846E-02	0.6633	304.6201	13.4030
26	4.5359E-02	0.6671	189.6944	12.8090
27	4.5900E-02	0.6710	33.1074	12.1403
28	4.6477E-02	0.6752	235.4108	11.4003
29	4.7099E-02	0.6797	149.7598	10.5942
30	4.7776E-02	0.6846	252.4286	9.7305
31	4.8525E-02	0.6899	327.7155	8.8189
32	4.9364E-02	0.6959	274.3913	7.8723
33	5.0319E-02	0.7026	94.4831	6.9083
34	5.1431E-02	0.7103	17.0872	5.9501
35	5.2750E-02	0.7194	264.9895	5.0271
36	5.4347E-02	0.7302	118.1643	4.1765
37	5.6312E-02	0.7432	227.7499	3.4378
38	5.8743E-02	0.7591	272.3078	2.8435
39	6.1723E-02	0.7781	356.7734	2.4013
40	6.5294E-02	0.8003	131.5219	2.0842
41	6.9488E-02	0.8256	88.9340	1.8432
42	7.4370E-02	0.8541	353.7181	1.6334
43	8.0117E-02	0.8865	260.1577	1.4298
44	8.7016E-02	0.9239	271.2081	1.2245

NUMBER	WAVE NUMBER	FREQUENCY	PHASE	ORDINATES
45	9.5554E-02	0.9682	234.5467	1.0177
46	1.0659E-01	1.0226	26.1669	0.8111
47	1.2176E-01	1.0929	227.3885	0.6076
48	1.4471E-01	1.1915	318.4946	0.4104
49	1.8661E-01	1.3530	98.1756	0.2237
50	3.2427E-01	1.7836	157.1081	0.0484

JOB TITLE-Tether tow

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
0.00								
1	1	POSITION	0.0000	0.0000	-0.5000	0.0000	0.0000	0.0000
		VELOCITY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		ACCELERATION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		DIFFRACTION	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		L/WAVE DRIFT DAMPING	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		TOTAL FORCE	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**** TIME HISTORY OF SINGLE TETHER NUMBER 1 ****

STEP NUMB	TIME (SECONDS)	NODE	POSITION ALONG TETHER	POSITIONS Y	Z	RY	RZ	VELOCITIES Y	Z	RY	RZ	ACCELERATIONS Y	Z	RY	RZ
1	0.00	14	266.5	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-1.218	5.190	0.000
		13	262.6	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.915	2.434	0.000
		12	257.6	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.747	1.351	0.000
		11	229.8	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.115	1.259	0.000
		10	202.0	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.295	-2.883	0.000
		9	174.2	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-3.897	-11.518	0.000
		8	146.4	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-7.606	0.086	0.000
		7	118.7	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-4.053	10.194	0.000
		6	90.9	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-1.865	-1.524	0.000
		5	63.1	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-3.838	-1.193	0.000
		4	35.3	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-1.405	7.404	0.000
		3	7.5	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	0.268	-2.404	0.000
		2	1.1	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-0.795	-14.249	0.000
		1	0.0	0.000	0.000	0.00	0.00	0.000	0.000	0.00	0.00	0.000	-1.067	-15.018	0.000

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * * ***

NODE NUMB	DIST-ANCE	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE Y	SHEAR FORCE Z	BENDING MOMENTS Y	BENDING MOMENTS Z	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES Y	STRESSES Z	UNKNOWN CRITERIA
14	266.5	0.000E+00										
			0.000E+00	-1.875E-09	-9.505E-03	1.621E-05	1.990E-12	0.00E+00	7.01E-04	7.01E-04	8.60E-11	0.00E+00
			0.000E+00	1.095E-06	-3.699E+01	-6.961E+01	-2.280E-06	0.00E+00	3.01E+03	-3.01E+03	-9.86E-05	0.00E+00
13	262.6	0.000E+00										
			0.000E+00	-1.095E-06	3.699E+01	-6.961E+01	-2.280E-06	0.00E+00	6.04E+02	-6.04E+02	-1.98E-05	0.00E+00
			0.000E+00	-2.344E-06	2.601E+01	-7.046E+01	4.036E-07	0.00E+00	6.12E+02	-6.12E+02	3.50E-06	0.00E+00
12	257.6	0.000E+00										
			0.000E+00	2.344E-06	-2.601E+01	-7.046E+01	4.035E-07	0.00E+00	2.09E+03	-2.09E+03	1.20E-05	0.00E+00
			0.000E+00	1.723E-06	-1.535E+01	-3.279E+01	2.526E-05	0.00E+00	9.75E+02	-9.75E+02	7.51E-04	0.00E+00
11	229.8	0.000E+00										
			0.000E+00	-1.723E-06	1.535E+01	-3.279E+01	2.526E-05	0.00E+00	9.75E+02	-9.75E+02	7.51E-04	0.00E+00
			0.000E+00	1.555E-08	-1.361E+01	-2.903E+02	4.027E-06	0.00E+00	8.63E+03	-8.63E+03	1.20E-04	0.00E+00
10	202.0	0.000E+00										
			0.000E+00	-1.555E-08	1.361E+01	-2.903E+02	4.027E-06	0.00E+00	8.63E+03	-8.63E+03	1.20E-04	0.00E+00
			0.000E+00	-9.154E-07	3.101E+01	-3.031E+02	7.209E-06	0.00E+00	9.01E+03	-9.01E+03	2.14E-04	0.00E+00
9	174.2	0.000E+00										
			0.000E+00	9.154E-07	-3.101E+01	-3.031E+02	7.209E-06	0.00E+00	9.01E+03	-9.01E+03	2.14E-04	0.00E+00
			0.000E+00	3.063E-07	4.425E+00	8.568E+02	3.660E-07	0.00E+00	2.55E+04	2.55E+04	1.09E-05	0.00E+00
8	146.4	0.000E+00										
			0.000E+00	-3.063E-07	-4.425E+00	8.568E+02	3.660E-07	0.00E+00	2.55E+04	2.55E+04	1.09E-05	0.00E+00
			0.000E+00	1.213E-06	-6.657E+01	-1.731E+02	-2.391E-05	0.00E+00	5.15E+03	-5.15E+03	-7.11E-04	0.00E+00
7	118.7	0.000E+00										
			0.000E+00	-1.213E-06	6.657E+01	-1.731E+02	-2.391E-05	0.00E+00	5.15E+03	-5.15E+03	-7.11E-04	0.00E+00
			0.000E+00	-1.665E-06	4.769E+00	-5.261E+02	2.241E-05	0.00E+00	1.56E+04	-1.56E+04	6.66E-04	0.00E+00
6	90.9	0.000E+00										
			0.000E+00	1.665E-06	-4.769E+00	-5.261E+02	2.241E-05	0.00E+00	1.56E+04	-1.56E+04	6.66E-04	0.00E+00
			0.000E+00	1.898E-06	3.055E+01	6.496E+02	3.470E-06	0.00E+00	1.93E+04	1.93E+04	1.03E-04	0.00E+00
5	63.1	0.000E+00										
			0.000E+00	-1.898E-06	-3.055E+01	6.496E+02	3.470E-06	0.00E+00	1.93E+04	1.93E+04	1.03E-04	0.00E+00
			0.000E+00	-1.859E-06	-3.515E+01	-8.409E+01	3.332E-06	0.00E+00	2.50E+03	-2.50E+03	9.91E-05	0.00E+00
4	35.3	0.000E+00										
			0.000E+00	1.859E-06	3.515E+01	-8.409E+01	3.332E-06	0.00E+00	2.50E+03	-2.50E+03	9.91E-05	0.00E+00
			0.000E+00	8.228E-07	-2.187E+01	-6.878E+02	-1.563E-05	0.00E+00	2.04E+04	-2.04E+04	-4.65E-04	0.00E+00
3	7.5	0.000E+00										
			0.000E+00	-8.228E-07	2.187E+01	-6.878E+02	-1.563E-05	0.00E+00	1.32E+04	-1.32E+04	-2.99E-04	0.00E+00
			0.000E+00	-1.963E-06	1.989E+02	-1.039E+02	-1.054E-06	0.00E+00	1.99E+03	-1.99E+03	-2.02E-05	0.00E+00
2	1.1	0.000E+00										
			0.000E+00	1.963E-06	-1.989E+02	-1.039E+02	-1.054E-06	0.00E+00	1.32E+02	-1.32E+02	-1.34E-06	0.00E+00
			0.000E+00	7.232E-11	-7.492E-03	-8.469E-04	-3.517E-13	0.00E+00	1.08E-03	-1.08E-03	-4.48E-13	0.00E+00
1	0.0	0.000E+00										

JOB TITLE-Tether tow

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
125.00								
501	1	POSITION	0.0000	0.0000	-0.5000	0.0000	0.0000	0.0000
		VELOCITY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		ACCELERATION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		DIFFRACTION	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		L/WAVE DRIFT DAMPING	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	0.0000E+00	0.0000E+00	1.5168E-01	0.0000E+00	0.0000E+00	0.0000E+00
		TOTAL FORCE	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

* * * * T I M E H I S T O R Y O F S I N G L E T E T H E R N U M B E R 1 * * * *

STEP NUMB	TIME (SECONDS)	NODE	POSITION ALONG TETHER	P O S I T I O N S Y	Z	RY	RZ	V E L O C I T I E S Y	Z	RY	RZ	A C C E L E R A T I O N S Y	Z	RY	RZ
501	125.00	14	266.4	0.000	0.303	-1.46	0.00	0.000	-0.858	-0.21	0.00	0.000	-2.116	1.905	0.000
		13	262.6	0.000	0.205	-1.50	0.00	0.000	-0.871	-0.19	0.00	0.000	-1.989	1.806	0.000
		12	257.5	0.000	0.072	-1.52	0.00	0.000	-0.887	-0.16	0.00	0.000	-1.833	1.725	0.000
		11	229.7	0.000	-0.691	-1.62	0.00	0.000	-0.843	0.46	0.00	0.000	-0.836	2.409	0.000
		10	202.0	0.000	-1.472	-1.56	0.00	0.000	-0.458	1.01	0.00	0.000	0.221	1.652	0.000
		9	174.2	0.000	-2.168	-1.28	0.00	0.000	-0.023	0.66	0.00	0.000	0.535	-0.479	0.000
		8	146.4	0.000	-2.695	-0.87	0.00	0.000	0.163	0.20	0.00	0.000	-0.105	-1.752	0.000
		7	118.6	0.000	-3.015	-0.46	0.00	0.000	0.283	0.38	0.00	0.000	-0.643	0.017	0.000
		6	90.8	0.000	-3.120	0.07	0.00	0.000	0.546	0.66	0.00	0.000	-0.013	2.197	0.000
		5	63.1	0.000	-2.898	0.91	0.00	0.000	0.816	0.32	0.00	0.000	0.882	0.867	0.000
		4	35.3	0.000	-2.197	1.96	0.00	0.000	0.769	-0.52	0.00	0.000	0.557	-2.086	0.000
		3	7.5	0.000	-1.085	2.46	0.00	0.000	0.367	-1.02	0.00	0.000	-0.860	-3.500	0.000
		2	1.1	0.000	-0.815	2.34	0.00	0.000	0.252	-0.99	0.00	0.000	-1.260	-3.351	0.000
		1	0.0	0.000	-0.772	2.33	0.00	0.000	0.234	-0.97	0.00	0.000	-1.320	-3.255	0.000

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * * ***

NODE NUMB	DIST-ANCE	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE Y	SHEAR FORCE Z	BENDING MOMENTS Y	BENDING MOMENTS Z	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES Y	STRESSES Z	UNKNOWN CRITERIA
14	266.4	0.000E+00										
			0.000E+00	-2.679E-08	7.657E-02	-7.081E-05	-4.974E-12	0.00E+00	3.06E-03	-3.06E-03	-2.15E-10	0.00E+00
			0.000E+00	-6.320E-07	-3.137E+01	-6.003E+01	1.243E-06	0.00E+00	2.59E+03	-2.59E+03	5.37E-05	0.00E+00
13	262.6	0.000E+00										
			0.000E+00	6.320E-07	3.137E+01	-6.003E+01	1.242E-06	0.00E+00	5.21E+02	-5.21E+02	1.08E-05	0.00E+00
			0.000E+00	-1.111E-06	7.566E-01	-1.305E+02	5.331E-06	0.00E+00	1.13E+03	-1.13E+03	4.63E-05	0.00E+00
12	257.5	0.000E+00										
			0.000E+00	1.111E-06	-7.566E-01	-1.305E+02	5.331E-06	0.00E+00	3.88E+03	-3.88E+03	1.58E-04	0.00E+00
			0.000E+00	-6.481E-06	1.960E+01	5.079E+01	1.322E-04	0.00E+00	1.51E+03	1.51E+03	3.93E-03	0.00E+00
11	229.7	0.000E+00										
			0.000E+00	6.481E-06	-1.960E+01	5.079E+01	1.322E-04	0.00E+00	1.51E+03	1.51E+03	3.93E-03	0.00E+00
			0.000E+00	-4.583E-06	2.954E+00	4.420E+02	3.092E-04	0.00E+00	1.31E+04	1.31E+04	9.19E-03	0.00E+00
10	202.0	0.000E+00										
			0.000E+00	4.583E-06	-2.954E+00	4.420E+02	3.092E-04	0.00E+00	1.31E+04	1.31E+04	9.19E-03	0.00E+00
			0.000E+00	8.754E-07	1.110E+01	6.804E+02	3.584E-04	0.00E+00	2.02E+04	2.02E+04	1.07E-02	0.00E+00
9	174.2	0.000E+00										
			0.000E+00	-8.754E-07	-1.110E+01	6.804E+02	3.584E-04	0.00E+00	2.02E+04	2.02E+04	1.07E-02	0.00E+00
			0.000E+00	3.431E-06	9.021E+00	1.103E+03	2.820E-04	0.00E+00	3.28E+04	3.28E+04	8.38E-03	0.00E+00
8	146.4	0.000E+00										
			0.000E+00	-3.431E-06	-9.021E+00	1.103E+03	2.820E-04	0.00E+00	3.28E+04	3.28E+04	8.38E-03	0.00E+00
			0.000E+00	1.109E-05	1.785E+01	1.231E+03	6.852E-05	0.00E+00	3.66E+04	3.66E+04	2.04E-03	0.00E+00
7	118.6	0.000E+00										
			0.000E+00	-1.109E-05	-1.785E+01	1.231E+03	6.852E-05	0.00E+00	3.66E+04	3.66E+04	2.04E-03	0.00E+00
			0.000E+00	1.251E-05	1.595E+01	1.702E+03	-2.459E-04	0.00E+00	5.06E+04	5.06E+04	-7.31E-03	0.00E+00
6	90.8	0.000E+00										
			0.000E+00	-1.251E-05	-1.595E+01	1.702E+03	-2.459E-04	0.00E+00	5.06E+04	5.06E+04	-7.31E-03	0.00E+00
			0.000E+00	6.387E-06	1.694E+01	2.271E+03	-5.428E-04	0.00E+00	6.75E+04	6.75E+04	-1.61E-02	0.00E+00
5	63.1	0.000E+00										
			0.000E+00	-6.387E-06	-1.694E+01	2.271E+03	-5.428E-04	0.00E+00	6.75E+04	6.75E+04	-1.61E-02	0.00E+00
			0.000E+00	-9.728E-06	-4.572E+01	1.968E+03	-4.893E-04	0.00E+00	5.85E+04	5.85E+04	-1.45E-02	0.00E+00
4	35.3	0.000E+00										
			0.000E+00	9.728E-06	4.572E+01	1.968E+03	-4.893E-04	0.00E+00	5.85E+04	5.85E+04	-1.45E-02	0.00E+00
			0.000E+00	-1.817E-05	-1.153E+02	-1.975E+02	-5.778E-05	0.00E+00	5.87E+03	-5.87E+03	-1.72E-03	0.00E+00
3	7.5	0.000E+00										
			0.000E+00	1.817E-05	1.153E+02	-1.975E+02	-5.778E-05	0.00E+00	3.78E+03	-3.78E+03	-1.11E-03	0.00E+00
			0.000E+00	-4.603E-08	1.719E+02	-9.017E+01	4.250E-07	0.00E+00	1.72E+03	-1.72E+03	8.13E-06	0.00E+00
2	1.1	0.000E+00										
			0.000E+00	4.601E-08	-1.719E+02	-9.017E+01	4.250E-07	0.00E+00	1.15E+02	-1.15E+02	5.42E-07	0.00E+00
			0.000E+00	7.080E-07	-3.792E-01	-1.714E-04	-2.396E-11	0.00E+00	2.18E-04	-2.18E-04	-3.05E-11	0.00E+00
1	0.0	0.000E+00										

JOB TITLE-Tether tow

TIME(SECS) / RECORD NO.	STRUCTURE NUMBER	POSITION, FORCES AND MOMENTS AT / CENTRE OF GRAVITY	DEGREE OF FREEDOM X SURGE	Y SWAY	Z HEAVE	RX ROLL	RY PITCH	RZ YAW
250.00								
1001	1	POSITION	0.0000	0.0000	-0.5000	0.0000	0.0000	0.0000
		VELOCITY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		ACCELERATION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		DIFFRACTION	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		L/WAVE DRIFT DAMPING	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	0.0000E+00	0.0000E+00	-7.3944E-01	0.0000E+00	0.0000E+00	0.0000E+00
		TOTAL FORCE	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**** TIME HISTORY OF SINGLE TETHER NUMBER 1 ****

STEP NUMB	TIME (SECONDS)	NODE	POSITION ALONG TETHER	POSITIONS Y	POSITIONS Z	POSITIONS RY	POSITIONS RZ	VELOCITIES Y	VELOCITIES Z	VELOCITIES RY	VELOCITIES RZ	ACCELERATIONS Y	ACCELERATIONS Z	ACCELERATIONS RY	ACCELERATIONS RZ
1001	250.00	14	266.5	0.000	-1.479	-1.39	0.00	0.000	1.460	-2.09	0.00	0.000	1.301	-3.114	0.000
		13	262.6	0.000	-1.573	-1.45	0.00	0.000	1.320	-2.07	0.00	0.000	1.096	-2.872	0.000
		12	257.6	0.000	-1.702	-1.48	0.00	0.000	1.138	-2.07	0.00	0.000	0.846	-2.820	0.000
		11	229.8	0.000	-2.416	-1.43	0.00	0.000	0.161	-1.87	0.00	0.000	-0.310	-1.576	0.000
		10	202.0	0.000	-3.044	-1.12	0.00	0.000	-0.533	-0.79	0.00	0.000	-0.448	1.124	0.000
		9	174.2	0.000	-3.464	-0.59	0.00	0.000	-0.474	1.01	0.00	0.000	0.594	2.545	0.000
		8	146.4	0.000	-3.618	-0.08	0.00	0.000	0.229	1.50	0.00	0.000	1.197	-0.783	0.000
		7	118.6	0.000	-3.601	0.08	0.00	0.000	0.641	0.04	0.00	0.000	-0.093	-3.582	0.000
		6	90.9	0.000	-3.587	-0.05	0.00	0.000	0.341	-1.10	0.00	0.000	-1.258	-0.757	0.000
		5	63.1	0.000	-3.611	0.00	0.00	0.000	-0.219	-0.91	0.00	0.000	-0.992	1.780	0.000
		4	35.3	0.000	-3.571	0.16	0.00	0.000	-0.283	0.65	0.00	0.000	0.410	3.015	0.000
		3	7.5	0.000	-3.504	0.06	0.00	0.000	0.293	1.71	0.00	0.000	1.765	3.638	0.000
		2	1.1	0.000	-3.511	-0.16	0.00	0.000	0.510	2.06	0.00	0.000	2.124	2.948	0.000
		1	0.0	0.000	-3.514	-0.17	0.00	0.000	0.548	2.09	0.00	0.000	2.179	3.039	0.000

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * * ***

NODE NUMB	DIST-ANCE	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE Y	SHEAR FORCE Z	BENDING MOMENTS Y	BENDING MOMENTS Z	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES Y	STRESSES Z	UNKNOWN CRITERIA
14	266.4	0.000E+00										
			0.000E+00	5.376E-07	-6.399E-01	1.460E-05	-4.402E-12	0.00E+00	6.31E-04	6.31E-04	-1.90E-10	0.00E+00
			0.000E+00	-7.831E-07	-4.084E+01	-7.795E+01	2.398E-06	0.00E+00	3.37E+03	-3.37E+03	1.04E-04	0.00E+00
13	262.6	0.000E+00										
			0.000E+00	7.831E-07	4.084E+01	-7.795E+01	2.398E-06	0.00E+00	6.77E+02	-6.77E+02	2.08E-05	0.00E+00
			0.000E+00	-2.619E-06	2.393E+01	-1.352E+02	1.006E-05	0.00E+00	1.17E+03	-1.17E+03	8.73E-05	0.00E+00
12	257.5	0.000E+00										
			0.000E+00	2.619E-06	-2.393E+01	-1.352E+02	1.006E-05	0.00E+00	4.02E+03	-4.02E+03	2.99E-04	0.00E+00
			0.000E+00	-8.147E-06	3.974E+01	7.225E+02	1.602E-04	0.00E+00	2.15E+04	2.15E+04	4.76E-03	0.00E+00
11	229.8	0.000E+00										
			0.000E+00	8.147E-06	-3.974E+01	7.225E+02	1.602E-04	0.00E+00	2.15E+04	2.15E+04	4.76E-03	0.00E+00
			0.000E+00	-1.053E-05	2.222E+01	1.755E+03	4.596E-04	0.00E+00	5.22E+04	5.22E+04	1.37E-02	0.00E+00
10	202.0	0.000E+00										
			0.000E+00	1.053E-05	-2.222E+01	1.755E+03	4.596E-04	0.00E+00	5.22E+04	5.22E+04	1.37E-02	0.00E+00
			0.000E+00	-1.434E-06	-2.454E+01	1.826E+03	6.350E-04	0.00E+00	5.43E+04	5.43E+04	1.89E-02	0.00E+00
9	174.2	0.000E+00										
			0.000E+00	1.434E-06	2.454E+01	1.826E+03	6.350E-04	0.00E+00	5.43E+04	5.43E+04	1.89E-02	0.00E+00
			0.000E+00	9.250E-06	-5.684E+01	5.921E+02	5.171E-04	0.00E+00	1.76E+04	1.76E+04	1.54E-02	0.00E+00
8	146.4	0.000E+00										
			0.000E+00	-9.250E-06	5.684E+01	5.921E+02	5.171E-04	0.00E+00	1.76E+04	1.76E+04	1.54E-02	0.00E+00
			0.000E+00	9.498E-06	-1.976E+01	-5.044E+02	2.060E-04	0.00E+00	1.50E+04	-1.50E+04	6.12E-03	0.00E+00
7	118.6	0.000E+00										
			0.000E+00	-9.498E-06	1.976E+01	-5.044E+02	2.060E-04	0.00E+00	1.50E+04	-1.50E+04	6.12E-03	0.00E+00
			0.000E+00	7.147E-06	4.440E+01	-3.906E+02	-4.097E-05	0.00E+00	1.16E+04	-1.16E+04	-1.22E-03	0.00E+00
6	90.9	0.000E+00										
			0.000E+00	-7.147E-06	-4.440E+01	-3.906E+02	-4.097E-05	0.00E+00	1.16E+04	-1.16E+04	-1.22E-03	0.00E+00
			0.000E+00	-3.659E-06	2.419E+01	8.363E+02	-5.682E-05	0.00E+00	2.49E+04	2.49E+04	-1.69E-03	0.00E+00
5	63.1	0.000E+00										
			0.000E+00	3.659E-06	-2.419E+01	8.363E+02	-5.682E-05	0.00E+00	2.49E+04	2.49E+04	-1.69E-03	0.00E+00
			0.000E+00	-5.703E-07	-3.253E+01	6.369E+02	2.863E-05	0.00E+00	1.89E+04	1.89E+04	8.51E-04	0.00E+00
4	35.3	0.000E+00										
			0.000E+00	5.703E-07	3.253E+01	6.369E+02	2.863E-05	0.00E+00	1.89E+04	1.89E+04	8.51E-04	0.00E+00
			0.000E+00	3.192E-07	-6.327E+01	-6.566E+02	2.009E-05	0.00E+00	1.95E+04	-1.95E+04	5.97E-04	0.00E+00
3	7.5	0.000E+00										
			0.000E+00	-3.192E-07	6.327E+01	-6.566E+02	2.009E-05	0.00E+00	1.26E+04	-1.26E+04	3.84E-04	0.00E+00
			0.000E+00	5.286E-06	2.369E+02	-1.237E+02	3.021E-06	0.00E+00	2.37E+03	-2.37E+03	5.78E-05	0.00E+00
2	1.1	0.000E+00										
			0.000E+00	-5.286E-06	-2.369E+02	-1.237E+02	3.021E-06	0.00E+00	1.58E+02	-1.58E+02	3.85E-06	0.00E+00
			0.000E+00	5.040E-07	-1.710E+00	4.609E-04	-4.938E-11	0.00E+00	5.87E-04	5.87E-04	-6.29E-11	0.00E+00
1	0.0	0.000E+00										

JOB TITLE-Tether tow

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
375.00								
1501	1	POSITION	0.0000	0.0000	-0.5000	0.0000	0.0000	0.0000
		VELOCITY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		ACCELERATION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	9.8100E+10	0.0000E+00	0.0000E+00	0.0000E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		DIFFRACTION	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		L/WAVE DRIFT DAMPING	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	0.0000E+00	0.0000E+00	-5.2491E-01	0.0000E+00	0.0000E+00	0.0000E+00
		TOTAL FORCE	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

* * * * T I M E H I S T O R Y O F S I N G L E T E T H E R N U M B E R 1 * * * *

STEP NUMB	TIME (SECONDS)	NODE	POSITION ALONG TETHER	POSITIONS Y	POSITIONS Z	POSITIONS RY	POSITIONS RZ	VELOCITIES Y	VELOCITIES Z	VELOCITIES RY	VELOCITIES RZ	ACCELERATIONS Y	ACCELERATIONS Z	ACCELERATIONS RY	ACCELERATIONS RZ
1501	375.00	14	266.4	0.000	-1.050	-1.98	0.00	0.000	-0.858	-1.35	0.00	0.000	0.051	-2.203	0.000
		13	262.5	0.000	-1.184	-2.03	0.00	0.000	-0.949	-1.36	0.00	0.000	-0.102	-2.368	0.000
		12	257.5	0.000	-1.364	-2.05	0.00	0.000	-1.068	-1.31	0.00	0.000	-0.309	-2.270	0.000
		11	229.7	0.000	-2.337	-1.91	0.00	0.000	-1.463	-0.02	0.00	0.000	-0.817	0.714	0.000
		10	201.9	0.000	-3.178	-1.55	0.00	0.000	-0.990	1.87	0.00	0.000	0.092	2.243	0.000
		9	174.2	0.000	-3.839	-1.19	0.00	0.000	0.107	2.38	0.00	0.000	0.728	0.333	0.000
		8	146.4	0.000	-4.360	-0.96	0.00	0.000	1.018	1.07	0.00	0.000	0.472	-1.371	0.000
		7	118.6	0.000	-4.742	-0.54	0.00	0.000	0.950	-1.31	0.00	0.000	-0.454	-1.968	0.000
		6	90.8	0.000	-4.819	0.29	0.00	0.000	0.057	-1.96	0.00	0.000	-0.737	1.030	0.000
		5	63.1	0.000	-4.435	1.27	0.00	0.000	-0.678	-0.87	0.00	0.000	-0.021	1.609	0.000
		4	35.3	0.000	-3.607	2.11	0.00	0.000	-0.661	0.85	0.00	0.000	0.890	1.473	0.000
		3	7.5	0.000	-2.479	2.40	0.00	0.000	-0.025	1.67	0.00	0.000	1.199	0.472	0.000
		2	1.1	0.000	-2.222	2.19	0.00	0.000	0.167	1.68	0.00	0.000	1.180	-0.668	0.000
		1	0.0	0.000	-2.182	2.18	0.00	0.000	0.198	1.67	0.00	0.000	1.167	-0.755	0.000

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * * ***

NODE NUMB	DIST-ANCE	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE Y	SHEAR FORCE Z	BENDING MOMENTS Y	BENDING MOMENTS Z	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES Y	STRESSES Z	UNKNOWN CRITERIA
14	266.4	0.000E+00										
			0.000E+00	8.007E-07	-5.887E-01	6.187E-05	-1.362E-12	0.00E+00	2.67E-03	2.67E-03	-5.89E-11	0.00E+00
			0.000E+00	-1.182E-06	-3.731E+01	-7.402E+01	3.609E-06	0.00E+00	3.20E+03	-3.20E+03	1.56E-04	0.00E+00
13	262.5	0.000E+00										
			0.000E+00	1.182E-06	3.731E+01	-7.402E+01	3.609E-06	0.00E+00	6.43E+02	-6.43E+02	3.13E-05	0.00E+00
			0.000E+00	-8.000E-06	5.746E+01	-3.490E+01	2.528E-05	0.00E+00	3.03E+02	-3.03E+02	2.19E-04	0.00E+00
12	257.5	0.000E+00										
			0.000E+00	8.000E-06	-5.746E+01	-3.490E+01	2.528E-05	0.00E+00	1.04E+03	-1.04E+03	7.51E-04	0.00E+00
			0.000E+00	-1.156E-05	3.650E+01	1.318E+03	3.400E-04	0.00E+00	3.92E+04	3.92E+04	1.01E-02	0.00E+00
11	229.7	0.000E+00										
			0.000E+00	1.156E-05	-3.650E+01	1.318E+03	3.400E-04	0.00E+00	3.92E+04	3.92E+04	1.01E-02	0.00E+00
			0.000E+00	-2.434E-06	-2.347E+01	1.426E+03	5.805E-04	0.00E+00	4.24E+04	4.24E+04	1.73E-02	0.00E+00
10	201.9	0.000E+00										
			0.000E+00	2.434E-06	2.347E+01	1.426E+03	5.805E-04	0.00E+00	4.24E+04	4.24E+04	1.73E-02	0.00E+00
			0.000E+00	9.985E-06	-4.194E+01	5.137E+02	4.778E-04	0.00E+00	1.53E+04	1.53E+04	1.42E-02	0.00E+00
9	174.2	0.000E+00										
			0.000E+00	-9.985E-06	4.194E+01	5.137E+02	4.778E-04	0.00E+00	1.53E+04	1.53E+04	1.42E-02	0.00E+00
			0.000E+00	1.697E-05	8.608E+00	-1.215E+02	6.896E-05	0.00E+00	3.61E+03	-3.61E+03	2.05E-03	0.00E+00
8	146.4	0.000E+00										
			0.000E+00	-1.697E-05	-8.608E+00	-1.215E+02	6.896E-05	0.00E+00	3.61E+03	-3.61E+03	2.05E-03	0.00E+00
			0.000E+00	5.432E-06	6.355E+01	1.107E+03	-2.741E-04	0.00E+00	3.29E+04	3.29E+04	-8.15E-03	0.00E+00
7	118.6	0.000E+00										
			0.000E+00	-5.432E-06	-6.355E+01	1.107E+03	-2.741E-04	0.00E+00	3.29E+04	3.29E+04	-8.15E-03	0.00E+00
			0.000E+00	-4.364E-06	3.972E+01	2.689E+03	-2.768E-04	0.00E+00	7.99E+04	7.99E+04	-8.23E-03	0.00E+00
6	90.8	0.000E+00										
			0.000E+00	4.364E-06	-3.972E+01	2.689E+03	-2.768E-04	0.00E+00	7.99E+04	7.99E+04	-8.23E-03	0.00E+00
			0.000E+00	-8.516E-07	-1.187E+01	2.848E+03	-1.638E-04	0.00E+00	8.46E+04	8.46E+04	-4.87E-03	0.00E+00
5	63.1	0.000E+00										
			0.000E+00	8.516E-07	1.187E+01	2.848E+03	-1.638E-04	0.00E+00	8.46E+04	8.46E+04	-4.87E-03	0.00E+00
			0.000E+00	-4.178E-06	-5.846E+01	2.104E+03	-1.038E-04	0.00E+00	6.26E+04	6.26E+04	-3.09E-03	0.00E+00
4	35.3	0.000E+00										
			0.000E+00	4.178E-06	5.846E+01	2.104E+03	-1.038E-04	0.00E+00	6.26E+04	6.26E+04	-3.09E-03	0.00E+00
			0.000E+00	-3.081E-06	-1.143E+02	-4.307E+02	7.695E-06	0.00E+00	1.28E+04	-1.28E+04	2.29E-04	0.00E+00
3	7.5	0.000E+00										
			0.000E+00	3.081E-06	1.143E+02	-4.307E+02	7.695E-06	0.00E+00	8.24E+03	-8.24E+03	1.47E-04	0.00E+00
			0.000E+00	3.263E-06	2.209E+02	-1.157E+02	2.278E-06	0.00E+00	2.21E+03	-2.21E+03	4.36E-05	0.00E+00
2	1.1	0.000E+00										
			0.000E+00	-3.263E-06	-2.209E+02	-1.157E+02	2.278E-06	0.00E+00	1.47E+02	-1.47E+02	2.90E-06	0.00E+00
			0.000E+00	8.009E-07	-1.071E+00	1.042E-04	-3.935E-11	0.00E+00	1.33E-04	1.33E-04	-5.01E-11	0.00E+00
1	0.0	0.000E+00										

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 1 DISTANCE 0.00 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.3510	0.7310	0.0000
2 x R.M.S		0.0000	2.9003	2.7456	0.0000
MEAN HIGHEST	+	0.0000	2.0577	2.1484	0.0000
1/3 PEAKS	-	0.0000	-2.4390	-2.3792	0.0000
MAXIMUM PEAKS	+	0.0000	1.7311	4.3557	0.0000
		0.0000	1.1575	3.8457	0.0000
		0.0000	0.9491	3.7400	0.0000
MINIMUM PEAKS	-	0.0000	-7.0086	-4.9408	0.0000
		0.0000	-6.9031	-3.1340	0.0000
		0.0000	-5.7041	-2.9167	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 1 DISTANCE 0.00 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0029	0.0064	0.0000
2 x R.M.S		0.0000	1.7569	2.4700	0.0000
MEAN HIGHEST	+	0.0000	1.6093	2.1467	0.0000
1/3 PEAKS	-	0.0000	-1.7276	-2.3627	0.0000
MAXIMUM PEAKS	+	0.0000	2.8080	3.8787	0.0000
		0.0000	2.7326	3.5467	0.0000
		0.0000	2.6155	3.4632	0.0000
MINIMUM PEAKS	-	0.0000	-2.9456	-3.9849	0.0000
		0.0000	-2.7595	-3.6966	0.0000
		0.0000	-2.5936	-3.6219	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 1 DISTANCE 0.00 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0006	0.0045	0.0000
2 x R.M.S		0.0000	2.3610	5.2209	0.0000
MEAN HIGHEST	+	0.0000	1.8021	4.5562	0.0000
1/3 PEAKS	-	0.0000	-2.5779	-4.7594	0.0000
MAXIMUM PEAKS	+	0.0000	3.0840	16.1186	0.0000
		0.0000	3.0648	10.0654	0.0000
		0.0000	2.5219	9.1781	0.0000
MINIMUM PEAKS	-	0.0000	-7.1510	-12.8807	0.0000
		0.0000	-5.1515	-12.2712	0.0000
		0.0000	-5.1083	-11.5510	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 2 DISTANCE 1.05 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.3645	0.7456	0.0000
2 x R.M.S		0.0000	2.8681	2.7435	0.0000
MEAN HIGHEST	+	0.0000	2.0331	2.1312	0.0000
1/3 PEAKS	-	0.0000	-2.4068	-2.4147	0.0000
MAXIMUM PEAKS	+	0.0000	1.6778	4.3689	0.0000
		0.0000	1.0959	3.8482	0.0000
		0.0000	0.9175	3.7518	0.0000
MINIMUM PEAKS	-	0.0000	-6.9179	-4.9228	0.0000
		0.0000	-6.8527	-3.1151	0.0000
		0.0000	-5.6517	-2.8991	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 2 DISTANCE 1.05 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0030	0.0066	0.0000
2 x R.M.S		0.0000	1.7217	2.4649	0.0000
MEAN HIGHEST	+	0.0000	1.5911	2.1385	0.0000
1/3 PEAKS	-	0.0000	-1.7031	-2.3568	0.0000
MAXIMUM PEAKS	+	0.0000	2.7721	3.9090	0.0000
		0.0000	2.6612	3.5234	0.0000
		0.0000	2.5706	3.4674	0.0000
MINIMUM PEAKS	-	0.0000	-2.8924	-3.9455	0.0000
		0.0000	-2.7090	-3.7007	0.0000
		0.0000	-2.5450	-3.5763	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 2 DISTANCE 1.05 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0005	0.0057	0.0000
2 x R.M.S		0.0000	2.2889	5.1310	0.0000
MEAN HIGHEST	+	0.0000	1.7663	4.5194	0.0000
1/3 PEAKS	-	0.0000	-2.5273	-4.6872	0.0000
MAXIMUM PEAKS	+	0.0000	2.9734	15.4110	0.0000
		0.0000	2.9722	9.7337	0.0000
		0.0000	2.4618	9.1350	0.0000
MINIMUM PEAKS	-	0.0000	-7.0047	-12.6097	0.0000
		0.0000	-5.0086	-11.9950	0.0000
		0.0000	-4.9804	-11.1589	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 3 DISTANCE 7.50 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.4586	0.9645	0.0000
2 x R.M.S		0.0000	2.6840	2.6888	0.0000
MEAN HIGHEST	+	0.0000	1.9260	2.0893	0.0000
1/3 PEAKS	-	0.0000	-2.2551	-2.3442	0.0000
MAXIMUM PEAKS	+	0.0000	1.3463	4.5235	0.0000
		0.0000	0.8167	3.9090	0.0000
		0.0000	0.7141	3.8801	0.0000
MINIMUM PEAKS	-	0.0000	-6.5581	-4.5878	0.0000
		0.0000	-6.3782	-2.7923	0.0000
		0.0000	-5.3459	-2.5994	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 3 DISTANCE 7.50 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0038	0.0070	0.0000
2 x R.M.S		0.0000	1.5207	2.3177	0.0000
MEAN HIGHEST	+	0.0000	1.4017	2.0234	0.0000
1/3 PEAKS	-	0.0000	-1.4962	-2.2117	0.0000
MAXIMUM PEAKS	+	0.0000	2.5534	4.2288	0.0000
		0.0000	2.2811	3.5090	0.0000
		0.0000	2.2027	2.9523	0.0000
MINIMUM PEAKS	-	0.0000	-2.5730	-3.6115	0.0000
		0.0000	-2.4120	-3.3171	0.0000
		0.0000	-2.2644	-3.1948	0.0000

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                    * * * * T E T H E R   1   S T A T I S T I C S * * * *
                          - - - - - - - - - - - - - - - - - - -

                   RECORDS    50(TIME=  24.75) TO   751(TIME= 375.00) PROCESSED
                   ------------------------------------------------------------

                   NODE     3  DISTANCE     7.50  -ACCELERATION
                   ---------------------------------------------

-------------------------------------------------------------------------
                         SWAY(Y)      HEAVE(Z)      PITCH(Y)       YAW(Z)
-------------------------------------------------------------------------

 MEAN VALUE              0.0000       -0.0004        0.0092        0.0000

 2  x R.M.S              0.0000        1.9100        4.1437        0.0000

 MEAN HIGHEST    +       0.0000        1.5147        3.6221        0.0000
 1/3  PEAKS      -       0.0000       -2.3079       -4.0324        0.0000

 MAXIMUM PEAKS   +       0.0000        2.4908        7.9892        0.0000
                         0.0000        2.4073        7.0449        0.0000
                         0.0000        2.0683        5.9055        0.0000

 MINIMUM PEAKS   -       0.0000       -6.0245      -10.8995        0.0000
                         0.0000       -4.2226       -9.4235        0.0000
                         0.0000       -4.1398       -8.0210        0.0000
```

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 4 DISTANCE 35.29 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.9586	1.0375	0.0000
2 x R.M.S		0.0000	2.2163	2.3672	0.0000
MEAN HIGHEST	+	0.0000	1.5808	1.8481	0.0000
1/3 PEAKS	-	0.0000	-1.9163	-2.0798	0.0000
MAXIMUM PEAKS	+	0.0000	0.2697	3.9162	0.0000
		0.0000	0.2569	3.7726	0.0000
		0.0000	0.1611	3.7549	0.0000
MINIMUM PEAKS	-	0.0000	-5.4053	-3.5263	0.0000
		0.0000	-4.9948	-2.3867	0.0000
		0.0000	-4.7487	-2.0683	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 4 DISTANCE 35.29 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0067	0.0046	0.0000
2 x R.M.S		0.0000	1.0102	1.7763	0.0000
MEAN HIGHEST	+	0.0000	0.8528	1.5743	0.0000
1/3 PEAKS	-	0.0000	-0.8890	-1.6555	0.0000
MAXIMUM PEAKS	+	0.0000	1.9913	2.9553	0.0000
		0.0000	1.4927	2.6119	0.0000
		0.0000	1.3334	2.4117	0.0000
MINIMUM PEAKS	-	0.0000	-1.4741	-2.4362	0.0000
		0.0000	-1.3995	-2.3742	0.0000
		0.0000	-1.2621	-2.3185	0.0000

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                          * * * * T E T H E R   1   S T A T I S T I C S * * * *
                              - - - - - - - - - - - - - - - - - - -

                          RECORDS    50(TIME=  24.75) TO   751(TIME= 375.00) PROCESSED
                          ------------------------------------------------------------

                          NODE     4  DISTANCE    35.29  -ACCELERATION
                          ----------------------------------------------

-------------------------------------------------------------------------------
                          SWAY(Y)      HEAVE(Z)      PITCH(Y)       YAW(Z)
-------------------------------------------------------------------------------

 MEAN VALUE               0.0000       -0.0027        0.0012        0.0000

 2  x R.M.S               0.0000        1.1999        2.5709        0.0000

 MEAN HIGHEST    +        0.0000        0.9510        2.1347        0.0000
 1/3  PEAKS      -        0.0000       -1.2003       -2.5131        0.0000

 MAXIMUM PEAKS   +        0.0000        1.6050        4.6210        0.0000
                          0.0000        1.4842        4.4575        0.0000
                          0.0000        1.4703        4.1763        0.0000

 MINIMUM PEAKS   -        0.0000       -2.5000       -7.8507        0.0000
                          0.0000       -2.3568       -5.4997        0.0000
                          0.0000       -1.8009       -4.6520        0.0000
```

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 5 DISTANCE 63.08 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.4213	0.8391	0.0000
2 x R.M.S		0.0000	2.2135	1.8706	0.0000
MEAN HIGHEST	+	0.0000	1.5869	1.5102	0.0000
1/3 PEAKS	-	0.0000	-1.9645	-1.5649	0.0000
MAXIMUM PEAKS	+	0.0000	-0.2705	3.5134	0.0000
		0.0000	-0.2824	3.0969	0.0000
		0.0000	-0.3908	2.9923	0.0000
MINIMUM PEAKS	-	0.0000	-5.6944	-2.6185	0.0000
		0.0000	-5.4770	-1.4967	0.0000
		0.0000	-5.3371	-1.4773	0.0000

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                    * * * * T E T H E R   1   S T A T I S T I C S * * * *
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                    RECORDS    50(TIME=  24.75) TO   751(TIME= 375.00) PROCESSED
                    ------------------------------------------------------------

                    NODE     5  DISTANCE    63.08  -  VELOCITY
                    ----------------------------------------

-------------------------------------------------------------------------
                         SWAY(Y)      HEAVE(Z)      PITCH(Y)       YAW(Z)
-------------------------------------------------------------------------

 MEAN VALUE              0.0000       -0.0081        0.0011        0.0000

 2  x R.M.S              0.0000        0.9366        1.3389        0.0000

 MEAN HIGHEST    +       0.0000        0.8323        1.0947        0.0000
 1/3  PEAKS      -       0.0000       -0.7534       -1.1754        0.0000

 MAXIMUM PEAKS   +       0.0000        1.3392        2.4252        0.0000
                         0.0000        1.2958        1.9393        0.0000
                         0.0000        1.2010        1.8027        0.0000

 MINIMUM PEAKS   -       0.0000       -1.1428       -2.3843        0.0000
                         0.0000       -1.0441       -2.0818        0.0000
                         0.0000       -1.0250       -1.9387        0.0000
```

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 5 DISTANCE 63.08 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0026	-0.0014	0.0000
2 x R.M.S		0.0000	1.0190	2.1622	0.0000
MEAN HIGHEST	+	0.0000	0.8328	1.8411	0.0000
1/3 PEAKS	-	0.0000	-1.0402	-2.0230	0.0000
MAXIMUM PEAKS	+	0.0000	1.5060	3.9593	0.0000
		0.0000	1.2504	2.8574	0.0000
		0.0000	1.1693	2.7953	0.0000
MINIMUM PEAKS	-	0.0000	-2.4716	-4.9604	0.0000
		0.0000	-2.1199	-4.6450	0.0000
		0.0000	-1.7836	-3.8319	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 6 DISTANCE 90.86 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.7517	0.5109	0.0000
2 x R.M.S		0.0000	2.3162	1.6460	0.0000
MEAN HIGHEST	+	0.0000	1.6613	1.3558	0.0000
1/3 PEAKS	-	0.0000	-1.9073	-1.3399	0.0000
MAXIMUM PEAKS	+	0.0000	-0.3842	2.6777	0.0000
		0.0000	-0.6588	2.6655	0.0000
		0.0000	-0.6678	2.6476	0.0000
MINIMUM PEAKS	-	0.0000	-6.4633	-2.6001	0.0000
		0.0000	-5.9725	-1.7470	0.0000
		0.0000	-5.4760	-1.5794	0.0000

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                    * * * * T E T H E R   1   S T A T I S T I C S * * * *
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                    RECORDS    50(TIME=  24.75) TO   751(TIME= 375.00) PROCESSED
                    ------------------------------------------------------------

                    NODE     6  DISTANCE    90.86  -  VELOCITY
                    ----------------------------------------

-------------------------------------------------------------------------
                        SWAY(Y)      HEAVE(Z)      PITCH(Y)       YAW(Z)
-------------------------------------------------------------------------

 MEAN VALUE             0.0000       -0.0076       -0.0035        0.0000

 2  x R.M.S             0.0000        0.9353        1.2460        0.0000

 MEAN HIGHEST    +      0.0000        0.8049        1.0514        0.0000
 1/3  PEAKS      -      0.0000       -0.7633       -1.0769        0.0000

 MAXIMUM PEAKS   +      0.0000        1.2577        1.9565        0.0000
                        0.0000        1.1746        1.5822        0.0000
                        0.0000        1.1616        1.4114        0.0000

 MINIMUM PEAKS   -      0.0000       -1.1273       -1.9736        0.0000
                        0.0000       -1.1182       -1.9632        0.0000
                        0.0000       -1.0900       -1.8850        0.0000
```

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 6 DISTANCE 90.86 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0007	-0.0061	0.0000
2 x R.M.S		0.0000	0.9554	2.0069	0.0000
MEAN HIGHEST	+	0.0000	0.8066	1.7768	0.0000
1/3 PEAKS	-	0.0000	-0.8825	-1.8898	0.0000
MAXIMUM PEAKS	+	0.0000	1.7890	3.2471	0.0000
		0.0000	1.4034	2.8296	0.0000
		0.0000	1.2782	2.7176	0.0000
MINIMUM PEAKS	-	0.0000	-1.9255	-4.0345	0.0000
		0.0000	-1.7587	-3.8551	0.0000
		0.0000	-1.5656	-3.6299	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 7 DISTANCE 118.65 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.9118	0.1488	0.0000
2 x R.M.S		0.0000	2.3270	1.7347	0.0000
MEAN HIGHEST	+	0.0000	1.6900	1.5119	0.0000
1/3 PEAKS	-	0.0000	-1.9413	-1.4273	0.0000
MAXIMUM PEAKS	+	0.0000	-0.6357	2.5487	0.0000
		0.0000	-0.6997	2.4313	0.0000
		0.0000	-0.7169	2.2287	0.0000
MINIMUM PEAKS	-	0.0000	-6.4177	-2.3321	0.0000
		0.0000	-6.2452	-2.3221	0.0000
		0.0000	-5.7376	-2.2520	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 7 DISTANCE 118.65 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0050	-0.0065	0.0000
2 x R.M.S		0.0000	0.8953	1.2920	0.0000
MEAN HIGHEST	+	0.0000	0.7749	1.1284	0.0000
1/3 PEAKS	-	0.0000	-0.7102	-1.1155	0.0000
MAXIMUM PEAKS	+	0.0000	1.2064	2.0285	0.0000
		0.0000	1.1894	1.9818	0.0000
		0.0000	1.1689	1.6974	0.0000
MINIMUM PEAKS	-	0.0000	-1.3074	-1.8314	0.0000
		0.0000	-1.2697	-1.8047	0.0000
		0.0000	-1.0489	-1.5926	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 7 DISTANCE 118.65 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0023	-0.0057	0.0000
2 x R.M.S		0.0000	0.9468	1.8980	0.0000
MEAN HIGHEST	+	0.0000	0.8500	1.7079	0.0000
1/3 PEAKS	-	0.0000	-0.8672	-1.7361	0.0000
MAXIMUM PEAKS	+	0.0000	2.0512	3.0771	0.0000
		0.0000	1.8175	2.9483	0.0000
		0.0000	1.6325	2.8128	0.0000
MINIMUM PEAKS	-	0.0000	-1.7105	-3.5820	0.0000
		0.0000	-1.3421	-3.1139	0.0000
		0.0000	-1.2680	-3.0164	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 8 DISTANCE 146.44 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.8987	-0.1974	0.0000
2 x R.M.S		0.0000	2.2669	1.8360	0.0000
MEAN HIGHEST	+	0.0000	1.5844	1.7291	0.0000
1/3 PEAKS	-	0.0000	-1.7398	-1.6424	0.0000
MAXIMUM PEAKS	+	0.0000	-0.6455	1.9529	0.0000
		0.0000	-0.9048	1.9006	0.0000
		0.0000	-0.9289	1.8656	0.0000
MINIMUM PEAKS	-	0.0000	-6.1826	-2.9767	0.0000
		0.0000	-5.6427	-2.7594	0.0000
		0.0000	-5.6089	-2.5857	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 8 DISTANCE 146.44 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0019	-0.0054	0.0000
2 x R.M.S		0.0000	0.8457	1.3704	0.0000
MEAN HIGHEST	+	0.0000	0.7144	1.2312	0.0000
1/3 PEAKS	-	0.0000	-0.7050	-1.1253	0.0000
MAXIMUM PEAKS	+	0.0000	1.2307	1.9856	0.0000
		0.0000	1.2300	1.9051	0.0000
		0.0000	1.0690	1.8948	0.0000
MINIMUM PEAKS	-	0.0000	-1.3702	-2.0159	0.0000
		0.0000	-1.1850	-1.7802	0.0000
		0.0000	-1.1746	-1.6278	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 8 DISTANCE 146.44 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0037	0.0013	0.0000
2 x R.M.S		0.0000	0.8867	1.8842	0.0000
MEAN HIGHEST	+	0.0000	0.7799	1.7380	0.0000
1/3 PEAKS	-	0.0000	-0.8282	-1.6039	0.0000
MAXIMUM PEAKS	+	0.0000	1.5390	4.2234	0.0000
		0.0000	1.3347	3.5103	0.0000
		0.0000	1.2238	3.3533	0.0000
MINIMUM PEAKS	-	0.0000	-1.7261	-3.1842	0.0000
		0.0000	-1.6749	-2.7410	0.0000
		0.0000	-1.5582	-2.7135	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 9 DISTANCE 174.23 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.7273	-0.5003	0.0000
2 x R.M.S		0.0000	2.2012	1.8135	0.0000
MEAN HIGHEST	+	0.0000	1.5912	1.5284	0.0000
1/3 PEAKS	-	0.0000	-1.8719	-1.5616	0.0000
MAXIMUM PEAKS	+	0.0000	-0.7820	1.9001	0.0000
		0.0000	-0.8297	1.8432	0.0000
		0.0000	-0.9535	1.7245	0.0000
MINIMUM PEAKS	-	0.0000	-5.4378	-2.9925	0.0000
		0.0000	-5.3704	-2.8423	0.0000
		0.0000	-5.1329	-2.7944	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 9 DISTANCE 174.23 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0001	-0.0025	0.0000
2 x R.M.S		0.0000	0.8816	1.3360	0.0000
MEAN HIGHEST	+	0.0000	0.7201	1.1944	0.0000
1/3 PEAKS	-	0.0000	-0.7141	-1.1330	0.0000
MAXIMUM PEAKS	+	0.0000	1.1750	2.3826	0.0000
		0.0000	1.1391	2.3752	0.0000
		0.0000	1.0949	2.2659	0.0000
MINIMUM PEAKS	-	0.0000	-1.5729	-1.7242	0.0000
		0.0000	-1.4193	-1.7048	0.0000
		0.0000	-1.2335	-1.6665	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 9 DISTANCE 174.23 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0010	0.0088	0.0000
2 x R.M.S		0.0000	0.8391	2.0181	0.0000
MEAN HIGHEST	+	0.0000	0.6948	1.8869	0.0000
1/3 PEAKS	-	0.0000	-0.7639	-1.8500	0.0000
MAXIMUM PEAKS	+	0.0000	1.3575	3.6944	0.0000
		0.0000	1.1820	3.6503	0.0000
		0.0000	1.0876	3.2689	0.0000
MINIMUM PEAKS	-	0.0000	-1.6477	-4.1883	0.0000
		0.0000	-1.4164	-3.4545	0.0000
		0.0000	-1.2903	-3.2850	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 10 DISTANCE 202.01 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.4233	-0.7412	0.0000
2 x R.M.S		0.0000	2.1515	1.8512	0.0000
MEAN HIGHEST	+	0.0000	1.5782	1.6365	0.0000
1/3 PEAKS	-	0.0000	-1.8012	-1.5254	0.0000
MAXIMUM PEAKS	+	0.0000	-0.4097	1.9098	0.0000
		0.0000	-0.4227	1.8017	0.0000
		0.0000	-0.4782	1.4696	0.0000
MINIMUM PEAKS	-	0.0000	-5.1918	-3.3181	0.0000
		0.0000	-4.9058	-2.9032	0.0000
		0.0000	-4.8293	-2.7230	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 10 DISTANCE 202.01 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0008	-0.0011	0.0000
2 x R.M.S		0.0000	0.9640	1.2341	0.0000
MEAN HIGHEST	+	0.0000	0.8372	1.0395	0.0000
1/3 PEAKS	-	0.0000	-0.8056	-0.9311	0.0000
MAXIMUM PEAKS	+	0.0000	1.2972	2.1135	0.0000
		0.0000	1.1812	2.0616	0.0000
		0.0000	1.1793	1.8652	0.0000
MINIMUM PEAKS	-	0.0000	-1.8955	-1.7033	0.0000
		0.0000	-1.4307	-1.6096	0.0000
		0.0000	-1.3177	-1.5478	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 10 DISTANCE 202.01 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0030	0.0077	0.0000
2 x R.M.S		0.0000	0.9887	1.6829	0.0000
MEAN HIGHEST	+	0.0000	0.8897	1.4646	0.0000
1/3 PEAKS	-	0.0000	-0.9067	-1.4452	0.0000
MAXIMUM PEAKS	+	0.0000	1.5775	2.9715	0.0000
		0.0000	1.4589	2.6341	0.0000
		0.0000	1.2632	2.5170	0.0000
MINIMUM PEAKS	-	0.0000	-1.6449	-3.3460	0.0000
		0.0000	-1.6163	-2.9323	0.0000
		0.0000	-1.5504	-2.6288	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 11 DISTANCE 229.80 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-2.0231	-0.8914	0.0000
2 x R.M.S		0.0000	2.2013	1.9966	0.0000
MEAN HIGHEST	+	0.0000	1.8001	1.7174	0.0000
1/3 PEAKS	-	0.0000	-2.0443	-1.6978	0.0000
MAXIMUM PEAKS	+	0.0000	0.4677	2.0212	0.0000
		0.0000	0.1880	1.7661	0.0000
		0.0000	0.0985	1.6562	0.0000
MINIMUM PEAKS	-	0.0000	-5.1595	-3.7853	0.0000
		0.0000	-4.5996	-3.3112	0.0000
		0.0000	-4.4792	-3.2095	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 11 DISTANCE 229.80 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0013	-0.0013	0.0000
2 x R.M.S		0.0000	1.0347	1.5498	0.0000
MEAN HIGHEST	+	0.0000	0.8076	1.4047	0.0000
1/3 PEAKS	-	0.0000	-0.8911	-1.3130	0.0000
MAXIMUM PEAKS	+	0.0000	1.3533	2.2653	0.0000
		0.0000	1.2390	2.2438	0.0000
		0.0000	1.0748	1.8992	0.0000
MINIMUM PEAKS	-	0.0000	-2.4516	-2.5952	0.0000
		0.0000	-1.5410	-2.0852	0.0000
		0.0000	-1.4818	-1.8681	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 11 DISTANCE 229.80 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0059	0.0035	0.0000
2 x R.M.S		0.0000	0.9305	2.1158	0.0000
MEAN HIGHEST	+	0.0000	0.7809	1.9886	0.0000
1/3 PEAKS	-	0.0000	-0.7890	-1.8377	0.0000
MAXIMUM PEAKS	+	0.0000	1.5962	4.1226	0.0000
		0.0000	1.3894	3.6274	0.0000
		0.0000	1.2167	3.3021	0.0000
MINIMUM PEAKS	-	0.0000	-1.7308	-3.5155	0.0000
		0.0000	-1.6066	-2.8469	0.0000
		0.0000	-1.3702	-2.7863	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 12 DISTANCE 257.59 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.5794	-0.9131	0.0000
2 x R.M.S		0.0000	2.5114	2.0721	0.0000
MEAN HIGHEST	+	0.0000	2.0882	1.7591	0.0000
1/3 PEAKS	-	0.0000	-2.1645	-1.7676	0.0000
MAXIMUM PEAKS	+	0.0000	1.8811	2.0430	0.0000
		0.0000	1.6473	1.9905	0.0000
		0.0000	1.4955	1.8240	0.0000
MINIMUM PEAKS	-	0.0000	-5.3619	-4.0112	0.0000
		0.0000	-4.5517	-3.6042	0.0000
		0.0000	-4.1879	-3.3655	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 12 DISTANCE 257.59 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0022	-0.0023	0.0000
2 x R.M.S		0.0000	1.3826	1.8494	0.0000
MEAN HIGHEST	+	0.0000	1.1636	1.6526	0.0000
1/3 PEAKS	-	0.0000	-1.2562	-1.5779	0.0000
MAXIMUM PEAKS	+	0.0000	1.7924	2.9996	0.0000
		0.0000	1.6421	2.7570	0.0000
		0.0000	1.6129	2.6185	0.0000
MINIMUM PEAKS	-	0.0000	-3.0532	-3.2632	0.0000
		0.0000	-2.1536	-2.9387	0.0000
		0.0000	-1.9519	-2.2703	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 12 DISTANCE 257.59 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0059	-0.0027	0.0000
2 x R.M.S		0.0000	1.2983	3.1797	0.0000
MEAN HIGHEST	+	0.0000	1.0843	2.9889	0.0000
1/3 PEAKS	-	0.0000	-1.2197	-2.8348	0.0000
MAXIMUM PEAKS	+	0.0000	1.9796	6.5329	0.0000
		0.0000	1.8406	6.3816	0.0000
		0.0000	1.7970	6.3218	0.0000
MINIMUM PEAKS	-	0.0000	-2.1246	-5.9933	0.0000
		0.0000	-1.8446	-4.6527	0.0000
		0.0000	-1.8329	-4.3570	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 13 DISTANCE 262.64 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.5001	-0.8876	0.0000
2 x R.M.S		0.0000	2.6015	2.0757	0.0000
MEAN HIGHEST	+	0.0000	2.1227	1.7362	0.0000
1/3 PEAKS	-	0.0000	-2.1671	-1.7742	0.0000
MAXIMUM PEAKS	+	0.0000	2.1979	2.0745	0.0000
		0.0000	1.9837	2.0199	0.0000
		0.0000	1.7339	1.8570	0.0000
MINIMUM PEAKS	-	0.0000	-5.4375	-3.9888	0.0000
		0.0000	-4.5607	-3.5856	0.0000
		0.0000	-4.2316	-3.3460	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 13 DISTANCE 262.64 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0024	-0.0024	0.0000
2 x R.M.S		0.0000	1.4895	1.8644	0.0000
MEAN HIGHEST	+	0.0000	1.2360	1.6852	0.0000
1/3 PEAKS	-	0.0000	-1.3223	-1.6005	0.0000
MAXIMUM PEAKS	+	0.0000	2.0528	3.0264	0.0000
		0.0000	1.9278	2.8099	0.0000
		0.0000	1.7142	2.6258	0.0000
MINIMUM PEAKS	-	0.0000	-3.2160	-3.3238	0.0000
		0.0000	-2.3225	-2.9688	0.0000
		0.0000	-2.1100	-2.3021	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 13 DISTANCE 262.64 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0057	-0.0032	0.0000
2 x R.M.S		0.0000	1.5041	3.2343	0.0000
MEAN HIGHEST	+	0.0000	1.2506	3.0158	0.0000
1/3 PEAKS	-	0.0000	-1.3749	-2.8640	0.0000
MAXIMUM PEAKS	+	0.0000	2.3392	6.5337	0.0000
		0.0000	2.0628	6.5173	0.0000
		0.0000	1.9854	6.4920	0.0000
MINIMUM PEAKS	-	0.0000	-2.6086	-6.2651	0.0000
		0.0000	-2.2557	-4.8220	0.0000
		0.0000	-2.0968	-4.0441	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 14 DISTANCE 266.49 - POSITION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-1.4432	-0.8329	0.0000
2 x R.M.S		0.0000	2.6764	2.0789	0.0000
MEAN HIGHEST	+	0.0000	2.1711	1.7409	0.0000
1/3 PEAKS	-	0.0000	-2.2021	-1.7807	0.0000
MAXIMUM PEAKS	+	0.0000	2.4364	2.1385	0.0000
		0.0000	2.2368	2.0706	0.0000
		0.0000	1.9117	1.9169	0.0000
MINIMUM PEAKS	-	0.0000	-5.4990	-3.9303	0.0000
		0.0000	-4.5707	-3.5356	0.0000
		0.0000	-4.3193	-3.2968	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 14 DISTANCE 266.49 - VELOCITY

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	0.0025	-0.0023	0.0000
2 x R.M.S		0.0000	1.5781	1.8823	0.0000
MEAN HIGHEST	+	0.0000	1.3033	1.7044	0.0000
1/3 PEAKS	-	0.0000	-1.4047	-1.6348	0.0000
MAXIMUM PEAKS	+	0.0000	2.2565	3.0032	0.0000
		0.0000	2.1544	2.8417	0.0000
		0.0000	1.8270	2.6305	0.0000
MINIMUM PEAKS	-	0.0000	-3.3471	-3.3873	0.0000
		0.0000	-2.4479	-3.0530	0.0000
		0.0000	-2.2301	-2.3373	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

NODE 14 DISTANCE 266.49 -ACCELERATION

		SWAY(Y)	HEAVE(Z)	PITCH(Y)	YAW(Z)
MEAN VALUE		0.0000	-0.0055	-0.0021	0.0000
2 x R.M.S		0.0000	1.6782	3.3090	0.0000
MEAN HIGHEST	+	0.0000	1.4190	3.0622	0.0000
1/3 PEAKS	-	0.0000	-1.5401	-2.9299	0.0000
MAXIMUM PEAKS	+	0.0000	2.8011	6.9600	0.0000
		0.0000	2.1753	6.6922	0.0000
		0.0000	2.1343	6.3458	0.0000
MINIMUM PEAKS	-	0.0000	-3.0558	-7.1462	0.0000
		0.0000	-2.6620	-4.9999	0.0000
		0.0000	-2.5383	-4.5487	0.0000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 1 DISTANCE 0.00 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		1.3546E-05	-3.6956E-13	1.3546E-05	4.9700E-04	1.7259E-05	-4.7085E-13	1.7259E-05
2 x R.M.S		1.4271E-03	1.2475E-10	1.4271E-03	1.5228E-03	1.8182E-03	1.5894E-10	1.8182E-03
MEAN HIGHEST	+	1.0860E-03	1.1058E-10	1.0860E-03	1.4676E-03	1.3837E-03	1.4088E-10	1.3837E-03
1/3 PEAKS	-	-1.0917E-03	-1.0377E-10	-1.0917E-03	-4.8159E-04	-1.3909E-03	-1.3221E-10	-1.3909E-03
MAXIMUM PEAKS	+	8.8816E-03	2.5443E-10	8.8816E-03	1.1316E-02	1.1316E-02	3.2416E-10	1.1316E-02
		5.4760E-03	2.2223E-10	5.4760E-03	6.9768E-03	6.9768E-03	2.8314E-10	6.9768E-03
		2.7153E-03	2.1613E-10	2.7153E-03	5.5576E-03	3.4596E-03	2.7537E-10	3.4596E-03
MINIMUM PEAKS	-	-4.3621E-03	-3.9006E-10	-4.3621E-03	1.4267E-11	-5.5576E-03	-4.9696E-10	-5.5576E-03
		-2.9912E-03	-2.7399E-10	-2.9912E-03	2.6579E-07	-3.8110E-03	-3.4908E-10	-3.8110E-03
		-2.5635E-03	-2.7177E-10	-2.5635E-03	3.0376E-07	-3.2661E-03	-3.4625E-10	-3.2661E-03

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 1 DISTANCE 1.05 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-1.1443E+02	6.3469E-07	-1.1443E+02	1.4579E+02	-1.4579E+02	8.0864E-07	-1.4579E+02
2 x R.M.S		2.9109E+01	2.8420E-06	2.9109E+01	3.7087E+01	3.7087E+01	3.6209E-06	3.7087E+01
MEAN HIGHEST	+	3.0353E+01	2.5350E-06	3.0353E+01	2.9051E+01	3.8672E+01	3.2297E-06	3.8672E+01
1/3 PEAKS	-	-2.2802E+01	-2.5183E-06	-2.2802E+01	-3.8672E+01	-2.9051E+01	-3.2085E-06	-2.9051E+01
MAXIMUM PEAKS	+	-2.9184E+01	5.6606E-06	-2.9184E+01	1.9611E+02	-3.7182E+01	7.2121E-06	-3.7182E+01
		-4.8067E+01	4.7161E-06	-4.8067E+01	1.9020E+02	-6.1241E+01	6.0086E-06	-6.1241E+01
		-5.3298E+01	4.2535E-06	-5.3298E+01	1.8884E+02	-6.7906E+01	5.4192E-06	-6.7906E+01
MINIMUM PEAKS	-	-1.5392E+02	-4.4085E-06	-1.5392E+02	3.7182E+01	-1.9611E+02	-5.6168E-06	-1.9611E+02
		-1.4928E+02	-3.0571E-06	-1.4928E+02	6.1241E+01	-1.9020E+02	-3.8950E-06	-1.9020E+02
		-1.4822E+02	-2.9274E-06	-1.4822E+02	6.7906E+01	-1.8884E+02	-3.7297E-06	-1.8884E+02

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 2 DISTANCE 1.05 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-1.1443E+02	6.3470E-07	-1.1443E+02	2.1890E+03	-2.1890E+03	1.2142E-05	-2.1890E+03
2 x R.M.S		2.9109E+01	2.8419E-06	2.9109E+01	5.5684E+02	5.5684E+02	5.4365E-05	5.5684E+02
MEAN HIGHEST	+	3.0353E+01	2.5349E-06	3.0353E+01	4.3619E+02	5.8064E+02	4.8492E-05	5.8064E+02
1/3 PEAKS	-	-2.2801E+01	-2.5182E-06	-2.2801E+01	-5.8064E+02	-4.3619E+02	-4.8173E-05	-4.3619E+02
MAXIMUM PEAKS	+	-2.9177E+01	5.6606E-06	-2.9177E+01	2.9445E+03	-5.5814E+02	1.0829E-04	-5.5814E+02
		-4.8072E+01	4.7159E-06	-4.8072E+01	2.8557E+03	-9.1960E+02	9.0213E-05	-9.1960E+02
		-5.3302E+01	4.2536E-06	-5.3302E+01	2.8354E+03	-1.0196E+03	8.1370E-05	-1.0196E+03
MINIMUM PEAKS	-	-1.5392E+02	-4.4082E-06	-1.5392E+02	5.5814E+02	-2.9445E+03	-8.4327E-05	-2.9445E+03
		-1.4928E+02	-3.0572E-06	-1.4928E+02	9.1960E+02	-2.8557E+03	-5.8483E-05	-2.8557E+03
		-1.4822E+02	-2.9273E-06	-1.4822E+02	1.0196E+03	-2.8354E+03	-5.5998E-05	-2.8354E+03

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 2 DISTANCE 7.50 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-6.8477E+02	2.5383E-06	-6.8477E+02	1.3104E+04	-1.3099E+04	4.8558E-05	-1.3099E+04
2 x R.M.S		4.1293E+02	5.8876E-05	4.1293E+02	7.8680E+03	7.8993E+03	1.1263E-03	7.8993E+03
MEAN HIGHEST	+	3.6111E+02	4.9747E-05	3.6111E+02	7.0417E+03	6.9080E+03	9.5164E-04	6.9080E+03
1/3 PEAKS	-	-3.6835E+02	-5.6028E-05	-3.6835E+02	-6.8409E+03	-7.0464E+03	-1.0718E-03	-7.0464E+03
MAXIMUM PEAKS	+	7.3213E+01	8.4141E-05	7.3213E+01	2.5531E+04	1.4005E+03	1.6096E-03	1.4005E+03
		1.3154E+01	7.4836E-05	1.3154E+01	2.5110E+04	2.5163E+02	1.4316E-03	2.5163E+02
		-9.9992E+01	7.1586E-05	-9.9992E+01	2.4833E+04	-1.9128E+03	1.3694E-03	-1.9128E+03
MINIMUM PEAKS	-	-1.3346E+03	-1.0973E-04	-1.3346E+03	2.5163E+02	-2.5531E+04	-2.0992E-03	-2.5531E+04
		-1.3126E+03	-8.3015E-05	-1.3126E+03	1.4005E+03	-2.5110E+04	-1.5881E-03	-2.5110E+04
		-1.2981E+03	-7.8705E-05	-1.2981E+03	1.9128E+03	-2.4833E+04	-1.5056E-03	-2.4833E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 3 DISTANCE 7.50 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-6.8477E+02	2.5383E-06	-6.8477E+02	2.0360E+04	-2.0353E+04	7.5446E-05	-2.0353E+04
2 x R.M.S		4.1293E+02	5.8876E-05	4.1293E+02	1.2225E+04	1.2273E+04	1.7499E-03	1.2273E+04
MEAN HIGHEST	+	3.6111E+02	4.9747E-05	3.6111E+02	1.0941E+04	1.0733E+04	1.4786E-03	1.0733E+04
1/3 PEAKS	-	-3.6835E+02	-5.6028E-05	-3.6835E+02	-1.0629E+04	-1.0948E+04	-1.6653E-03	-1.0948E+04
MAXIMUM PEAKS	+	7.3214E+01	8.4141E-05	7.3214E+01	3.9668E+04	2.1761E+03	2.5009E-03	2.1761E+03
		1.3154E+01	7.4836E-05	1.3154E+01	3.9015E+04	3.9097E+02	2.2243E-03	3.9097E+02
		-9.9992E+01	7.1586E-05	-9.9992E+01	3.8584E+04	-2.9720E+03	2.1277E-03	-2.9720E+03
MINIMUM PEAKS	-	-1.3346E+03	-1.0973E-04	-1.3346E+03	3.9097E+02	-3.9668E+04	-3.2616E-03	-3.9668E+04
		-1.3126E+03	-8.3015E-05	-1.3126E+03	2.1761E+03	-3.9015E+04	-2.4674E-03	-3.9015E+04
		-1.2981E+03	-7.8705E-05	-1.2981E+03	2.9720E+03	-3.8584E+04	-2.3393E-03	-3.8584E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 3 DISTANCE 35.29 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		2.3441E+02	3.0495E-06	2.3441E+02	2.6620E+04	6.9674E+03	9.0640E-05	6.9674E+03
2 x R.M.S		2.2960E+03	4.2394E-04	2.2960E+03	4.4909E+04	6.8242E+04	1.2601E-02	6.8242E+04
MEAN HIGHEST	+	1.8659E+03	3.4878E-04	1.8659E+03	3.6572E+04	5.5459E+04	1.0367E-02	5.5459E+04
1/3 PEAKS	-	-1.8937E+03	-4.0845E-04	-1.8937E+03	-2.4971E+04	-5.6284E+04	-1.2140E-02	-5.6284E+04
MAXIMUM PEAKS	+	3.9646E+03	6.1317E-04	3.9646E+03	1.2236E+05	1.1784E+05	1.8225E-02	1.1784E+05
		3.5790E+03	4.9926E-04	3.5790E+03	1.1784E+05	1.0638E+05	1.4839E-02	1.0638E+05
		3.4819E+03	4.8196E-04	3.4819E+03	1.1438E+05	1.0349E+05	1.4325E-02	1.0349E+05
MINIMUM PEAKS	-	-4.1167E+03	-6.6131E-04	-4.1167E+03	6.7679E+01	-1.2236E+05	-1.9656E-02	-1.2236E+05
		-3.8483E+03	-5.5099E-04	-3.8483E+03	2.6141E+02	-1.1438E+05	-1.6377E-02	-1.1438E+05
		-3.0591E+03	-5.2639E-04	-3.0591E+03	2.6890E+02	-9.0923E+04	-1.5646E-02	-9.0923E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 4 DISTANCE 35.29 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		2.3441E+02	3.0495E-06	2.3441E+02	2.6620E+04	6.9674E+03	9.0640E-05	6.9674E+03
2 x R.M.S		2.2960E+03	4.2394E-04	2.2960E+03	4.4909E+04	6.8242E+04	1.2601E-02	6.8242E+04
MEAN HIGHEST	+	1.8659E+03	3.4878E-04	1.8659E+03	3.6572E+04	5.5459E+04	1.0367E-02	5.5459E+04
1/3 PEAKS	-	-1.8937E+03	-4.0845E-04	-1.8937E+03	-2.4971E+04	-5.6284E+04	-1.2140E-02	-5.6284E+04
MAXIMUM PEAKS	+	3.9646E+03	6.1317E-04	3.9646E+03	1.2236E+05	1.1784E+05	1.8225E-02	1.1784E+05
		3.5790E+03	4.9926E-04	3.5790E+03	1.1784E+05	1.0638E+05	1.4839E-02	1.0638E+05
		3.4819E+03	4.8196E-04	3.4819E+03	1.1438E+05	1.0349E+05	1.4325E-02	1.0349E+05
MINIMUM PEAKS	-	-4.1167E+03	-6.6131E-04	-4.1167E+03	6.7678E+01	-1.2236E+05	-1.9656E-02	-1.2236E+05
		-3.8483E+03	-5.5099E-04	-3.8483E+03	2.6141E+02	-1.1438E+05	-1.6377E-02	-1.1438E+05
		-3.0591E+03	-5.2639E-04	-3.0591E+03	2.6890E+02	-9.0923E+04	-1.5646E-02	-9.0923E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 4 DISTANCE 63.08 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		7.1757E+02	1.3546E-06	7.1757E+02	3.9041E+04	2.1328E+04	4.0263E-05	2.1328E+04
2 x R.M.S		3.0846E+03	6.3239E-04	3.0846E+03	6.4252E+04	9.1683E+04	1.8796E-02	9.1683E+04
MEAN HIGHEST	+	2.5333E+03	5.3483E-04	2.5333E+03	5.4203E+04	7.5298E+04	1.5897E-02	7.5298E+04
1/3 PEAKS	-	-2.4714E+03	-6.3006E-04	-2.4714E+03	-3.6873E+04	-7.3456E+04	-1.8727E-02	-7.3456E+04
MAXIMUM PEAKS	+	5.3725E+03	9.5964E-04	5.3725E+03	1.6531E+05	1.5968E+05	2.8523E-02	1.5968E+05
		4.9682E+03	9.1898E-04	4.9682E+03	1.5968E+05	1.4767E+05	2.7314E-02	1.4767E+05
		4.7398E+03	7.1688E-04	4.7398E+03	1.4767E+05	1.4088E+05	2.1308E-02	1.4088E+05
MINIMUM PEAKS	-	-5.5617E+03	-9.4184E-04	-5.5617E+03	1.3379E+02	-1.6531E+05	-2.7994E-02	-1.6531E+05
		-3.8936E+03	-8.7638E-04	-3.8936E+03	2.6396E+02	-1.1573E+05	-2.6048E-02	-1.1573E+05
		-3.5710E+03	-7.7695E-04	-3.5710E+03	2.7132E+02	-1.0614E+05	-2.3093E-02	-1.0614E+05

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 5 DISTANCE 63.08 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		7.1757E+02	1.3546E-06	7.1757E+02	3.9041E+04	2.1328E+04	4.0263E-05	2.1328E+04
2 x R.M.S		3.0846E+03	6.3239E-04	3.0846E+03	6.4252E+04	9.1683E+04	1.8796E-02	9.1683E+04
MEAN HIGHEST	+	2.5333E+03	5.3483E-04	2.5333E+03	5.4203E+04	7.5298E+04	1.5897E-02	7.5298E+04
1/3 PEAKS	-	-2.4714E+03	-6.3006E-04	-2.4714E+03	-3.6873E+04	-7.3456E+04	-1.8727E-02	-7.3456E+04
MAXIMUM PEAKS	+	5.3725E+03	9.5964E-04	5.3725E+03	1.6531E+05	1.5968E+05	2.8523E-02	1.5968E+05
		4.9682E+03	9.1898E-04	4.9682E+03	1.5968E+05	1.4767E+05	2.7314E-02	1.4767E+05
		4.7398E+03	7.1688E-04	4.7398E+03	1.4767E+05	1.4088E+05	2.1308E-02	1.4088E+05
MINIMUM PEAKS	-	-5.5617E+03	-9.4184E-04	-5.5617E+03	1.3379E+02	-1.6531E+05	-2.7994E-02	-1.6531E+05
		-3.8936E+03	-8.7638E-04	-3.8936E+03	2.6396E+02	-1.1573E+05	-2.6048E-02	-1.1573E+05
		-3.5710E+03	-7.7695E-04	-3.5710E+03	2.7132E+02	-1.0614E+05	-2.3093E-02	-1.0614E+05

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 5 DISTANCE 90.86 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		9.0655E+02	-2.0058E-07	9.0655E+02	4.2437E+04	2.6945E+04	-5.9616E-06	2.6945E+04
2 x R.M.S		3.1684E+03	6.0998E-04	3.1684E+03	6.7595E+04	9.4173E+04	1.8130E-02	9.4173E+04
MEAN HIGHEST 1/3 PEAKS	+	2.7688E+03	5.3198E-04	2.7688E+03	5.9794E+04	8.2297E+04	1.5812E-02	8.2297E+04
	-	-2.5772E+03	-5.8679E-04	-2.5772E+03	-4.0484E+04	-7.6602E+04	-1.7441E-02	-7.6602E+04
MAXIMUM PEAKS	+	5.8412E+03	9.9619E-04	5.8412E+03	1.7361E+05	1.7361E+05	2.9609E-02	1.7361E+05
		5.4589E+03	7.9811E-04	5.4589E+03	1.6225E+05	1.6225E+05	2.3722E-02	1.6225E+05
		5.3168E+03	6.2529E-04	5.3168E+03	1.5803E+05	1.5803E+05	1.8585E-02	1.5803E+05
MINIMUM PEAKS	-	-4.3024E+03	-9.9977E-04	-4.3024E+03	4.1347E+01	-1.2788E+05	-2.9716E-02	-1.2788E+05
		-3.4893E+03	-7.3307E-04	-3.4893E+03	1.9529E+02	-1.0371E+05	-2.1789E-02	-1.0371E+05
		-3.2773E+03	-6.8573E-04	-3.2773E+03	2.1490E+02	-9.7409E+04	-2.0382E-02	-9.7409E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 6 DISTANCE 90.86 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		9.0655E+02	-2.0058E-07	9.0655E+02	4.2437E+04	2.6945E+04	-5.9616E-06	2.6945E+04
2 x R.M.S		3.1684E+03	6.0998E-04	3.1684E+03	6.7595E+04	9.4173E+04	1.8130E-02	9.4173E+04
MEAN HIGHEST	+	2.7688E+03	5.3198E-04	2.7688E+03	5.9794E+04	8.2297E+04	1.5812E-02	8.2297E+04
1/3 PEAKS	-	-2.5772E+03	-5.8679E-04	-2.5772E+03	-4.0484E+04	-7.6602E+04	-1.7441E-02	-7.6602E+04
MAXIMUM PEAKS	+	5.8412E+03	9.9619E-04	5.8412E+03	1.7361E+05	1.7361E+05	2.9609E-02	1.7361E+05
		5.4589E+03	7.9811E-04	5.4589E+03	1.6225E+05	1.6225E+05	2.3722E-02	1.6225E+05
		5.3168E+03	6.2529E-04	5.3168E+03	1.5803E+05	1.5803E+05	1.8585E-02	1.5803E+05
MINIMUM PEAKS	-	-4.3024E+03	-9.9977E-04	-4.3024E+03	4.1347E+01	-1.2788E+05	-2.9716E-02	-1.2788E+05
		-3.4893E+03	-7.3307E-04	-3.4893E+03	1.9529E+02	-1.0371E+05	-2.1789E-02	-1.0371E+05
		-3.2773E+03	-6.8573E-04	-3.2773E+03	2.1490E+02	-9.7409E+04	-2.0382E-02	-9.7409E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 6 DISTANCE 118.65 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		9.1681E+02	-1.7122E-06	9.1681E+02	4.0637E+04	2.7250E+04	-5.0890E-05	2.7250E+04
2 x R.M.S		2.9905E+03	4.8868E-04	2.9905E+03	6.5309E+04	8.8885E+04	1.4525E-02	8.8885E+04
MEAN HIGHEST	+	2.6607E+03	4.1605E-04	2.6607E+03	5.6694E+04	7.9082E+04	1.2366E-02	7.9082E+04
1/3 PEAKS	-	-2.4584E+03	-4.2314E-04	-2.4584E+03	-3.8813E+04	-7.3070E+04	-1.2577E-02	-7.3070E+04
MAXIMUM PEAKS	+	5.6493E+03	5.7199E-04	5.6493E+03	1.6791E+05	1.6791E+05	1.7001E-02	1.6791E+05
		5.0945E+03	5.2895E-04	5.0945E+03	1.5142E+05	1.5142E+05	1.5722E-02	1.5142E+05
		4.8871E+03	5.0526E-04	4.8871E+03	1.4526E+05	1.4526E+05	1.5018E-02	1.4526E+05
MINIMUM PEAKS	-	-3.0413E+03	-6.8691E-04	-3.0413E+03	1.9890E+00	-9.0394E+04	-2.0417E-02	-9.0394E+04
		-2.9960E+03	-6.6765E-04	-2.9960E+03	1.4451E+02	-8.9048E+04	-1.9844E-02	-8.9048E+04
		-2.8368E+03	-5.3837E-04	-2.8368E+03	1.4825E+02	-8.4318E+04	-1.6002E-02	-8.4318E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 7 DISTANCE 118.65 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		9.1681E+02	-1.7122E-06	9.1681E+02	4.0637E+04	2.7250E+04	-5.0890E-05	2.7250E+04
2 x R.M.S		2.9905E+03	4.8868E-04	2.9905E+03	6.5309E+04	8.8885E+04	1.4525E-02	8.8885E+04
MEAN HIGHEST	+	2.6607E+03	4.1605E-04	2.6607E+03	5.6694E+04	7.9082E+04	1.2366E-02	7.9082E+04
1/3 PEAKS	-	-2.4584E+03	-4.2314E-04	-2.4584E+03	-3.8813E+04	-7.3070E+04	-1.2577E-02	-7.3070E+04
MAXIMUM PEAKS	+	5.6493E+03	5.7199E-04	5.6493E+03	1.6791E+05	1.6791E+05	1.7001E-02	1.6791E+05
		5.0945E+03	5.2895E-04	5.0945E+03	1.5142E+05	1.5142E+05	1.5722E-02	1.5142E+05
		4.8871E+03	5.0526E-04	4.8871E+03	1.4526E+05	1.4526E+05	1.5018E-02	1.4526E+05
MINIMUM PEAKS	-	-3.0413E+03	-6.8691E-04	-3.0413E+03	1.9901E+00	-9.0394E+04	-2.0417E-02	-9.0394E+04
		-2.9960E+03	-6.6765E-04	-2.9960E+03	1.4451E+02	-8.9048E+04	-1.9844E-02	-8.9048E+04
		-2.8368E+03	-5.3837E-04	-2.8368E+03	1.4825E+02	-8.4318E+04	-1.6002E-02	-8.4318E+04

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 7 DISTANCE 146.44 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		8.3134E+02	-9.3104E-07	8.3134E+02	3.8947E+04	2.4710E+04	-2.7673E-05	2.4710E+04
2 x R.M.S		2.8374E+03	5.0067E-04	2.8374E+03	5.9051E+04	8.4334E+04	1.4881E-02	8.4334E+04
MEAN HIGHEST	+	2.2885E+03	4.4969E-04	2.2885E+03	4.7927E+04	6.8021E+04	1.3366E-02	6.8021E+04
1/3 PEAKS	-	-2.2786E+03	-4.5792E-04	-2.2786E+03	-3.6947E+04	-6.7727E+04	-1.3611E-02	-6.7727E+04
MAXIMUM PEAKS	+	4.7827E+03	6.9357E-04	4.7827E+03	1.4215E+05	1.4215E+05	2.0615E-02	1.4215E+05
		4.4794E+03	6.3177E-04	4.4794E+03	1.3314E+05	1.3314E+05	1.8778E-02	1.3314E+05
		4.4087E+03	5.1709E-04	4.4087E+03	1.3104E+05	1.3104E+05	1.5369E-02	1.3104E+05
MINIMUM PEAKS	-	-3.9196E+03	-8.5029E-04	-3.9196E+03	4.5202E+01	-1.1650E+05	-2.5273E-02	-1.1650E+05
		-3.2980E+03	-5.5855E-04	-3.2980E+03	5.9647E+01	-9.8024E+04	-1.6602E-02	-9.8024E+04
		-2.6674E+03	-5.5525E-04	-2.6674E+03	2.4361E+02	-7.9282E+04	-1.6504E-02	-7.9282E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 8 DISTANCE 146.44 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		8.3134E+02	-9.3104E-07	8.3134E+02	3.8947E+04	2.4710E+04	-2.7673E-05	2.4710E+04
2 x R.M.S		2.8374E+03	5.0067E-04	2.8374E+03	5.9051E+04	8.4334E+04	1.4881E-02	8.4334E+04
MEAN HIGHEST	+	2.2885E+03	4.4969E-04	2.2885E+03	4.7927E+04	6.8021E+04	1.3366E-02	6.8021E+04
1/3 PEAKS	-	-2.2786E+03	-4.5792E-04	-2.2786E+03	-3.6947E+04	-6.7727E+04	-1.3611E-02	-6.7727E+04
MAXIMUM PEAKS	+	4.7827E+03	6.9357E-04	4.7827E+03	1.4215E+05	1.4215E+05	2.0615E-02	1.4215E+05
		4.4794E+03	6.3177E-04	4.4794E+03	1.3314E+05	1.3314E+05	1.8778E-02	1.3314E+05
		4.4087E+03	5.1709E-04	4.4087E+03	1.3104E+05	1.3104E+05	1.5369E-02	1.3104E+05
MINIMUM PEAKS	-	-3.9196E+03	-8.5029E-04	-3.9196E+03	4.5202E+01	-1.1650E+05	-2.5273E-02	-1.1650E+05
		-3.2980E+03	-5.5855E-04	-3.2980E+03	5.9646E+01	-9.8024E+04	-1.6602E-02	-9.8024E+04
		-2.6674E+03	-5.5525E-04	-2.6674E+03	2.4361E+02	-7.9282E+04	-1.6504E-02	-7.9282E+04

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 8 DISTANCE 174.23 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		6.9727E+02	2.8676E-06	6.9727E+02	3.7399E+04	2.0725E+04	8.5232E-05	2.0725E+04
2 x R.M.S		2.8791E+03	5.8664E-04	2.8791E+03	5.8704E+04	8.5573E+04	1.7437E-02	8.5573E+04
MEAN HIGHEST 1/3 PEAKS	+	2.4456E+03	5.2288E-04	2.4456E+03	4.9266E+04	7.2691E+04	1.5541E-02	7.2691E+04
	-	-2.4635E+03	-5.9038E-04	-2.4635E+03	-3.5618E+04	-7.3223E+04	-1.7548E-02	-7.3223E+04
MAXIMUM PEAKS	+	5.1733E+03	7.9705E-04	5.1733E+03	1.5376E+05	1.5376E+05	2.3690E-02	1.5376E+05
		4.4721E+03	7.3578E-04	4.4721E+03	1.3292E+05	1.3292E+05	2.1869E-02	1.3292E+05
		4.3919E+03	6.7937E-04	4.3919E+03	1.3054E+05	1.3054E+05	2.0193E-02	1.3054E+05
MINIMUM PEAKS	-	-3.7597E+03	-8.3045E-04	-3.7597E+03	1.2189E+02	-1.1175E+05	-2.4683E-02	-1.1175E+05
		-3.2924E+03	-7.9528E-04	-3.2924E+03	1.7022E+02	-9.7858E+04	-2.3638E-02	-9.7858E+04
		-3.1240E+03	-7.0171E-04	-3.1240E+03	1.7080E+02	-9.2854E+04	-2.0857E-02	-9.2854E+04

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 9 DISTANCE 174.23 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		6.9727E+02	2.8676E-06	6.9727E+02	3.7399E+04	2.0725E+04	8.5232E-05	2.0725E+04
2 x R.M.S		2.8791E+03	5.8664E-04	2.8791E+03	5.8704E+04	8.5573E+04	1.7437E-02	8.5573E+04
MEAN HIGHEST	+	2.4456E+03	5.2288E-04	2.4456E+03	4.9266E+04	7.2691E+04	1.5541E-02	7.2691E+04
1/3 PEAKS	-	-2.4635E+03	-5.9038E-04	-2.4635E+03	-3.5618E+04	-7.3223E+04	-1.7548E-02	-7.3223E+04
MAXIMUM PEAKS	+	5.1733E+03	7.9705E-04	5.1733E+03	1.5376E+05	1.5376E+05	2.3690E-02	1.5376E+05
		4.4721E+03	7.3578E-04	4.4721E+03	1.3292E+05	1.3292E+05	2.1869E-02	1.3292E+05
		4.3919E+03	6.7937E-04	4.3919E+03	1.3054E+05	1.3054E+05	2.0193E-02	1.3054E+05
MINIMUM PEAKS	-	-3.7597E+03	-8.3045E-04	-3.7597E+03	1.2189E+02	-1.1175E+05	-2.4683E-02	-1.1175E+05
		-3.2924E+03	-7.9528E-04	-3.2924E+03	1.7022E+02	-9.7858E+04	-2.3638E-02	-9.7858E+04
		-3.1240E+03	-7.0171E-04	-3.1240E+03	1.7080E+02	-9.2854E+04	-2.0857E-02	-9.2854E+04

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 9 DISTANCE 202.01 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		5.1175E+02	5.6977E-06	5.1175E+02	3.2531E+04	1.5211E+04	1.6935E-04	1.5211E+04
2 x R.M.S		2.5472E+03	5.4080E-04	2.5472E+03	4.9235E+04	7.5709E+04	1.6074E-02	7.5709E+04
MEAN HIGHEST	+	2.2889E+03	4.8594E-04	2.2889E+03	4.4603E+04	6.8033E+04	1.4443E-02	6.8033E+04
1/3 PEAKS	-	-2.2355E+03	-5.3047E-04	-2.2355E+03	-3.0964E+04	-6.6444E+04	-1.5767E-02	-6.6444E+04
MAXIMUM PEAKS	+	4.2877E+03	8.4890E-04	4.2877E+03	1.2744E+05	1.2744E+05	2.5232E-02	1.2744E+05
		3.7469E+03	5.8053E-04	3.7469E+03	1.1137E+05	1.1137E+05	1.7255E-02	1.1137E+05
		3.5780E+03	5.7699E-04	3.5780E+03	1.0635E+05	1.0635E+05	1.7150E-02	1.0635E+05
MINIMUM PEAKS	-	-2.8920E+03	-8.9026E-04	-2.8920E+03	2.3122E+01	-8.5957E+04	-2.6461E-02	-8.5957E+04
		-2.5055E+03	-7.3330E-04	-2.5055E+03	4.8772E+01	-7.4469E+04	-2.1796E-02	-7.4469E+04
		-2.4675E+03	-6.6081E-04	-2.4675E+03	1.1967E+02	-7.3340E+04	-1.9641E-02	-7.3340E+04

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 10 DISTANCE 202.01 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		5.1175E+02	5.6977E-06	5.1175E+02	3.2531E+04	1.5211E+04	1.6935E-04	1.5211E+04
2 x R.M.S		2.5472E+03	5.4080E-04	2.5472E+03	4.9235E+04	7.5709E+04	1.6074E-02	7.5709E+04
MEAN HIGHEST	+	2.2889E+03	4.8594E-04	2.2889E+03	4.4603E+04	6.8033E+04	1.4443E-02	6.8033E+04
1/3 PEAKS	-	-2.2355E+03	-5.3047E-04	-2.2355E+03	-3.0964E+04	-6.6444E+04	-1.5767E-02	-6.6444E+04
MAXIMUM PEAKS	+	4.2877E+03	8.4890E-04	4.2877E+03	1.2744E+05	1.2744E+05	2.5232E-02	1.2744E+05
		3.7469E+03	5.8053E-04	3.7469E+03	1.1137E+05	1.1137E+05	1.7255E-02	1.1137E+05
		3.5780E+03	5.7699E-04	3.5780E+03	1.0635E+05	1.0635E+05	1.7150E-02	1.0635E+05
MINIMUM PEAKS	-	-2.8920E+03	-8.9026E-04	-2.8920E+03	2.3122E+01	-8.5957E+04	-2.6461E-02	-8.5957E+04
		-2.5055E+03	-7.3330E-04	-2.5055E+03	4.8772E+01	-7.4469E+04	-2.1796E-02	-7.4469E+04
		-2.4675E+03	-6.6081E-04	-2.4675E+03	1.1967E+02	-7.3340E+04	-1.9641E-02	-7.3340E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 10 DISTANCE 229.80 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		2.3749E+02	6.4921E-06	2.3749E+02	1.9655E+04	7.0589E+03	1.9296E-04	7.0589E+03
2 x R.M.S		1.5478E+03	3.0181E-04	1.5478E+03	2.7757E+04	4.6005E+04	8.9706E-03	4.6005E+04
MEAN HIGHEST	+	1.3127E+03	2.5404E-04	1.3127E+03	2.5114E+04	3.9018E+04	7.5509E-03	3.9018E+04
1/3 PEAKS	-	-1.3049E+03	-2.9015E-04	-1.3049E+03	-1.7351E+04	-3.8785E+04	-8.6240E-03	-3.8785E+04
MAXIMUM PEAKS	+	2.5795E+03	4.4726E-04	2.5795E+03	7.6670E+04	7.6670E+04	1.3294E-02	7.6670E+04
		2.4277E+03	4.1145E-04	2.4277E+03	7.2159E+04	7.2159E+04	1.2229E-02	7.2159E+04
		2.2613E+03	3.4003E-04	2.2613E+03	6.9302E+04	6.7212E+04	1.0107E-02	6.7212E+04
MINIMUM PEAKS	-	-2.3316E+03	-4.7746E-04	-2.3316E+03	6.2199E+00	-6.9302E+04	-1.4191E-02	-6.9302E+04
		-2.0447E+03	-4.5322E-04	-2.0447E+03	1.0618E+01	-6.0774E+04	-1.3471E-02	-6.0774E+04
		-1.8876E+03	-3.6263E-04	-1.8876E+03	1.9233E+02	-5.6105E+04	-1.0778E-02	-5.6105E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 11 DISTANCE 229.80 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		2.3749E+02	6.4921E-06	2.3749E+02	1.9655E+04	7.0589E+03	1.9296E-04	7.0589E+03
2 x R.M.S		1.5478E+03	3.0181E-04	1.5478E+03	2.7757E+04	4.6005E+04	8.9706E-03	4.6005E+04
MEAN HIGHEST 1/3 PEAKS	+	1.3127E+03	2.5404E-04	1.3127E+03	2.5114E+04	3.9018E+04	7.5509E-03	3.9018E+04
	-	-1.3049E+03	-2.9015E-04	-1.3049E+03	-1.7351E+04	-3.8785E+04	-8.6240E-03	-3.8785E+04
MAXIMUM PEAKS	+	2.5795E+03	4.4726E-04	2.5795E+03	7.6670E+04	7.6670E+04	1.3294E-02	7.6670E+04
		2.4277E+03	4.1145E-04	2.4277E+03	7.2159E+04	7.2159E+04	1.2229E-02	7.2159E+04
		2.2613E+03	3.4003E-04	2.2613E+03	6.9302E+04	6.7212E+04	1.0107E-02	6.7212E+04
MINIMUM PEAKS	-	-2.3316E+03	-4.7746E-04	-2.3316E+03	6.2196E+00	-6.9302E+04	-1.4191E-02	-6.9302E+04
		-2.0447E+03	-4.5322E-04	-2.0447E+03	1.0619E+01	-6.0774E+04	-1.3471E-02	-6.0774E+04
		-1.8876E+03	-3.6263E-04	-1.8876E+03	1.9233E+02	-5.6105E+04	-1.0778E-02	-5.6105E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 11 DISTANCE 257.59 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-1.4684E+02	2.7036E-06	-1.4684E+02	4.3816E+03	-4.3643E+03	8.0359E-05	-4.3643E+03
2 x R.M.S		1.4048E+02	2.2806E-05	1.4048E+02	4.1025E+03	4.1755E+03	6.7785E-04	4.1755E+03
MEAN HIGHEST	+	1.1835E+02	1.9355E-05	1.1835E+02	3.6980E+03	3.5176E+03	5.7527E-04	3.5176E+03
1/3 PEAKS	-	-1.2500E+02	-2.0232E-05	-1.2500E+02	-3.3509E+03	-3.7153E+03	-6.0135E-04	-3.7153E+03
MAXIMUM PEAKS	+	8.9926E+01	3.8141E-05	8.9926E+01	1.3135E+04	2.6728E+03	1.1337E-03	2.6728E+03
		6.3351E+01	3.1196E-05	6.3351E+01	1.0913E+04	1.8829E+03	9.2724E-04	1.8829E+03
		1.8598E+01	2.8996E-05	1.8598E+01	1.0255E+04	5.5279E+02	8.6184E-04	5.5279E+02
MINIMUM PEAKS	-	-4.4193E+02	-2.9757E-05	-4.4193E+02	2.8543E+01	-1.3135E+04	-8.8445E-04	-1.3135E+04
		-3.6716E+02	-2.9610E-05	-3.6716E+02	1.5005E+02	-1.0913E+04	-8.8010E-04	-1.0913E+04
		-3.4501E+02	-2.8767E-05	-3.4501E+02	1.7144E+02	-1.0255E+04	-8.5503E-04	-1.0255E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 12 DISTANCE 257.59 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-1.4684E+02	2.7036E-06	-1.4684E+02	1.2799E+03	-1.2749E+03	2.3474E-05	-1.2749E+03
2 x R.M.S		1.4048E+02	2.2806E-05	1.4048E+02	1.1984E+03	1.2197E+03	1.9801E-04	1.2197E+03
MEAN HIGHEST	+	1.1835E+02	1.9355E-05	1.1835E+02	1.0802E+03	1.0275E+03	1.6804E-04	1.0275E+03
1/3 PEAKS	-	-1.2500E+02	-2.0232E-05	-1.2500E+02	-9.7882E+02	-1.0853E+03	-1.7566E-04	-1.0853E+03
MAXIMUM PEAKS	+	8.9926E+01	3.8141E-05	8.9926E+01	3.8369E+03	7.8076E+02	3.3115E-04	7.8076E+02
		6.3350E+01	3.1196E-05	6.3350E+01	3.1878E+03	5.5002E+02	2.7086E-04	5.5002E+02
		1.8598E+01	2.8996E-05	1.8598E+01	2.9955E+03	1.6148E+02	2.5175E-04	1.6148E+02
MINIMUM PEAKS	-	-4.4193E+02	-2.9757E-05	-4.4193E+02	8.3364E+00	-3.8369E+03	-2.5836E-04	-3.8369E+03
		-3.6716E+02	-2.9610E-05	-3.6716E+02	4.3831E+01	-3.1878E+03	-2.5709E-04	-3.1878E+03
		-3.4501E+02	-2.8767E-05	-3.4501E+02	5.0084E+01	-2.9955E+03	-2.4976E-04	-2.9955E+03

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 12 DISTANCE 262.64 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT	STRESS	Z(VERTICAL) MAXIMUM BND MOMENT		MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-7.9147E+01	1.2929E-06	-7.9147E+01	6.8717E+02	-6.8717E+02	1.1226E-05	-6.8717E+02	
2 x R.M.S		1.6498E+01	2.8291E-06	1.6498E+01	1.4324E+02	1.4324E+02	2.4563E-05	1.4324E+02	
MEAN HIGHEST	+	1.5048E+01	2.4594E-06	1.5048E+01	1.2787E+02	1.3065E+02	2.1353E-05	1.3065E+02	
1/3 PEAKS	-	-1.4728E+01	-2.2607E-06	-1.4728E+01	-1.3065E+02	-1.2787E+02	-1.9628E-05	-1.2787E+02	
MAXIMUM PEAKS	+	-4.4304E+01	5.7624E-06	-4.4304E+01	9.0138E+02	-3.8466E+02	5.0031E-05	-3.8466E+02	
		-4.5436E+01	5.6524E-06	-4.5436E+01	8.9759E+02	-3.9449E+02	4.9075E-05	-3.9449E+02	
		-5.7250E+01	5.6167E-06	-5.7250E+01	8.9618E+02	-4.9706E+02	4.8766E-05	-4.9706E+02	
MINIMUM PEAKS	-	-1.0382E+02	-3.1824E-06	-1.0382E+02	3.8466E+02	-9.0138E+02	-2.7630E-05	-9.0138E+02	
		-1.0338E+02	-2.3735E-06	-1.0338E+02	3.9449E+02	-8.9759E+02	-2.0608E-05	-8.9759E+02	
		-1.0322E+02	-2.2941E-06	-1.0322E+02	4.9706E+02	-8.9618E+02	-1.9918E-05	-8.9618E+02	

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 13 DISTANCE 262.64 BENDING MOMENTS AND STRESSES

		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		-7.9147E+01	1.2929E-06	-7.9147E+01	3.4209E+03	-3.4209E+03	5.5884E-05	-3.4209E+03
2 x R.M.S		1.6498E+01	2.8291E-06	1.6498E+01	7.1308E+02	7.1308E+02	1.2228E-04	7.1308E+02
MEAN HIGHEST	+	1.5048E+01	2.4594E-06	1.5048E+01	6.3656E+02	6.5039E+02	1.0630E-04	6.5039E+02
1/3 PEAKS	-	-1.4728E+01	-2.2607E-06	-1.4728E+01	-6.5039E+02	-6.3656E+02	-9.7714E-05	-6.3656E+02
MAXIMUM PEAKS	+	-4.4304E+01	5.7625E-06	-4.4304E+01	4.4873E+03	-1.9149E+03	2.4907E-04	-1.9149E+03
		-4.5436E+01	5.6523E-06	-4.5436E+01	4.4684E+03	-1.9639E+03	2.4431E-04	-1.9639E+03
		-5.7250E+01	5.6167E-06	-5.7250E+01	4.4614E+03	-2.4745E+03	2.4277E-04	-2.4745E+03
MINIMUM PEAKS	-	-1.0382E+02	-3.1824E-06	-1.0382E+02	1.9149E+03	-4.4873E+03	-1.3755E-04	-4.4873E+03
		-1.0338E+02	-2.3734E-06	-1.0338E+02	1.9639E+03	-4.4684E+03	-1.0259E-04	-4.4684E+03
		-1.0322E+02	-2.2942E-06	-1.0322E+02	2.4745E+03	-4.4614E+03	-9.9161E-05	-4.4614E+03

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

ELEMENT 13 DISTANCE 266.49 BENDING MOMENTS AND STRESSES

STRESS		Y(LATERAL) BND MOMENT STRESS	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND BND MOMENT	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
MEAN VALUE		8.5154E-07	-2.5880E-14	8.5154E-07	7.5668E-04	3.6806E-05	-1.1186E-12	3.6806E-05
2 x R.M.S		5.2119E-05	7.9286E-12	5.2119E-05	1.6703E-03	2.2527E-03	3.4270E-10	2.2527E-03
MEAN HIGHEST	+	4.3729E-05	6.0700E-12	4.3729E-05	1.7653E-03	1.8901E-03	2.6236E-10	1.8901E-03
1/3 PEAKS	-	-4.4599E-05	-6.4282E-12	-4.4599E-05	-7.1566E-04	-1.9277E-03	-2.7784E-10	-1.9277E-03
MAXIMUM PEAKS	+	1.1182E-04	1.8275E-11	1.1182E-04	5.5854E-03	4.8331E-03	7.8990E-10	4.8331E-03
		1.0324E-04	1.5092E-11	1.0324E-04	4.8331E-03	4.4621E-03	6.5231E-10	4.4621E-03
		1.0216E-04	1.4907E-11	1.0216E-04	4.4621E-03	4.4157E-03	6.4433E-10	4.4157E-03
MINIMUM PEAKS	-	-1.2922E-04	-3.7829E-11	-1.2922E-04	2.0792E-10	-5.5854E-03	-1.6351E-09	-5.5854E-03
		-1.0228E-04	-2.5835E-11	-1.0228E-04	1.9322E-06	-4.4209E-03	-1.1167E-09	-4.4209E-03
		-9.8228E-05	-1.6755E-11	-9.8228E-05	1.9322E-06	-4.2457E-03	-7.2418E-10	-4.2457E-03

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MEAN VALUE

NODE	DISTNCE	POSITION Y	Z	RY	RZ	VELOCITY Y	Z	RY	RZ	ACCELERATION Y	Z	RY	RZ
1	0.00	0.000	-1.351	0.731	0.000	0.000	-0.003	0.006	0.000	0.000	0.001	0.004	0.000
2	1.05	0.000	-1.365	0.746	0.000	0.000	-0.003	0.007	0.000	0.000	0.001	0.006	0.000
3	7.50	0.000	-1.459	0.965	0.000	0.000	-0.004	0.007	0.000	0.000	0.000	0.009	0.000
4	35.29	0.000	-1.959	1.038	0.000	0.000	-0.007	0.005	0.000	0.000	-0.003	0.001	0.000
5	63.08	0.000	-2.421	0.839	0.000	0.000	-0.008	0.001	0.000	0.000	-0.003	-0.001	0.000
6	90.86	0.000	-2.752	0.511	0.000	0.000	-0.008	-0.004	0.000	0.000	-0.001	-0.006	0.000
7	118.65	0.000	-2.912	0.149	0.000	0.000	-0.005	-0.007	0.000	0.000	0.002	-0.006	0.000
8	146.44	0.000	-2.899	-0.197	0.000	0.000	-0.002	-0.005	0.000	0.000	0.004	0.001	0.000
9	174.23	0.000	-2.727	-0.500	0.000	0.000	0.000	-0.002	0.000	0.000	0.001	0.009	0.000
10	202.01	0.000	-2.423	-0.741	0.000	0.000	0.001	-0.001	0.000	0.000	-0.003	0.008	0.000
11	229.80	0.000	-2.023	-0.891	0.000	0.000	0.001	-0.001	0.000	0.000	-0.006	0.003	0.000
12	257.59	0.000	-1.579	-0.913	0.000	0.000	0.002	-0.002	0.000	0.000	-0.006	-0.003	0.000
13	262.64	0.000	-1.500	-0.888	0.000	0.000	0.002	-0.002	0.000	0.000	-0.006	-0.003	0.000
14	266.49	0.000	-1.443	-0.833	0.000	0.000	0.003	-0.002	0.000	0.000	-0.005	-0.002	0.000
MEAN		0.000	-2.058	0.001	0.000	0.000	-0.002	0.000	0.000	0.000	-0.002	0.001	0.000

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MEAN VALUE

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
1	0.00	1.355E-05	-3.696E-13	1.355E-05	4.970E-04	1.726E-05	-4.708E-13	1.726E-05
	1.05	-1.144E+02	6.347E-07	-1.144E+02	1.458E+02	-1.458E+02	8.086E-07	-1.458E+02
2	1.05	-1.144E+02	6.347E-07	-1.144E+02	2.189E+03	-2.189E+03	1.214E-05	-2.189E+03
	7.50	-6.848E+02	2.538E-06	-6.848E+02	1.310E+04	-1.310E+04	4.856E-05	-1.310E+04
3	7.50	-6.848E+02	2.538E-06	-6.848E+02	2.036E+04	-2.035E+04	7.545E-05	-2.035E+04
	35.29	2.344E+02	3.050E-06	2.344E+02	2.662E+04	6.967E+03	9.064E-05	6.967E+03
4	35.29	2.344E+02	3.050E-06	2.344E+02	2.662E+04	6.967E+03	9.064E-05	6.967E+03
	63.08	7.176E+02	1.355E-06	7.176E+02	3.904E+04	2.133E+04	4.026E-05	2.133E+04
5	63.08	7.176E+02	1.355E-06	7.176E+02	3.904E+04	2.133E+04	4.026E-05	2.133E+04
	90.86	9.066E+02	-2.006E-07	9.066E+02	4.244E+04	2.695E+04	-5.962E-06	2.695E+04
6	90.86	9.066E+02	-2.006E-07	9.066E+02	4.244E+04	2.695E+04	-5.962E-06	2.695E+04
	118.65	9.168E+02	-1.712E-06	9.168E+02	4.064E+04	2.725E+04	-5.089E-05	2.725E+04
7	118.65	9.168E+02	-1.712E-06	9.168E+02	4.064E+04	2.725E+04	-5.089E-05	2.725E+04
	146.44	8.313E+02	-9.310E-07	8.313E+02	3.895E+04	2.471E+04	-2.767E-05	2.471E+04
8	146.44	8.313E+02	-9.310E-07	8.313E+02	3.895E+04	2.471E+04	-2.767E-05	2.471E+04
	174.23	6.973E+02	2.868E-06	6.973E+02	3.740E+04	2.072E+04	8.523E-05	2.072E+04

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MEAN VALUE

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
9	174.23	6.973E+02	2.868E-06	6.973E+02	3.740E+04	2.072E+04	8.523E-05	2.072E+04
	202.01	5.117E+02	5.698E-06	5.117E+02	3.253E+04	1.521E+04	1.694E-04	1.521E+04
10	202.01	5.117E+02	5.698E-06	5.117E+02	3.253E+04	1.521E+04	1.694E-04	1.521E+04
	229.80	2.375E+02	6.492E-06	2.375E+02	1.966E+04	7.059E+03	1.930E-04	7.059E+03
11	229.80	2.375E+02	6.492E-06	2.375E+02	1.966E+04	7.059E+03	1.930E-04	7.059E+03
	257.59	-1.468E+02	2.704E-06	-1.468E+02	4.382E+03	-4.364E+03	8.036E-05	-4.364E+03
12	257.59	-1.468E+02	2.704E-06	-1.468E+02	1.280E+03	-1.275E+03	2.347E-05	-1.275E+03
	262.64	-7.915E+01	1.293E-06	-7.915E+01	6.872E+02	-6.872E+02	1.123E-05	-6.872E+02
13	262.64	-7.915E+01	1.293E-06	-7.915E+01	3.421E+03	-3.421E+03	5.588E-05	-3.421E+03
	266.49	8.515E-07	-2.588E-14	8.515E-07	7.567E-04	3.681E-05	-1.119E-12	3.681E-05
MEAN		3.098E+02	1.830E-06	3.098E+02	2.308E+04	9.802E+03	4.984E-05	9.802E+03

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

2 x R.M.S

		POSITION				VELOCITY				ACCELERATION			
NODE	DISTNCE	Y	Z	RY	RZ	Y	Z	RY	RZ	Y	Z	RY	RZ
1	0.00	0.000	2.900	2.746	0.000	0.000	1.757	2.470	0.000	0.000	2.361	5.221	0.000
2	1.05	0.000	2.868	2.744	0.000	0.000	1.722	2.465	0.000	0.000	2.289	5.131	0.000
3	7.50	0.000	2.684	2.689	0.000	0.000	1.521	2.318	0.000	0.000	1.910	4.144	0.000
4	35.29	0.000	2.216	2.367	0.000	0.000	1.010	1.776	0.000	0.000	1.200	2.571	0.000
5	63.08	0.000	2.213	1.871	0.000	0.000	0.937	1.339	0.000	0.000	1.019	2.162	0.000
6	90.86	0.000	2.316	1.646	0.000	0.000	0.935	1.246	0.000	0.000	0.955	2.007	0.000
7	118.65	0.000	2.327	1.735	0.000	0.000	0.895	1.292	0.000	0.000	0.947	1.898	0.000
8	146.44	0.000	2.267	1.836	0.000	0.000	0.846	1.370	0.000	0.000	0.887	1.884	0.000
9	174.23	0.000	2.201	1.813	0.000	0.000	0.882	1.336	0.000	0.000	0.839	2.018	0.000
10	202.01	0.000	2.151	1.851	0.000	0.000	0.964	1.234	0.000	0.000	0.989	1.683	0.000
11	229.80	0.000	2.201	1.997	0.000	0.000	1.035	1.550	0.000	0.000	0.930	2.116	0.000
12	257.59	0.000	2.511	2.072	0.000	0.000	1.383	1.849	0.000	0.000	1.298	3.180	0.000
13	262.64	0.000	2.602	2.076	0.000	0.000	1.489	1.864	0.000	0.000	1.504	3.234	0.000
14	266.49	0.000	2.676	2.079	0.000	0.000	1.578	1.882	0.000	0.000	1.678	3.309	0.000
MAXIMUM		0.000	2.900	2.746	0.000	0.000	1.757	2.470	0.000	0.000	2.361	5.221	0.000

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

2 x R.M.S

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
1	0.00	1.427E-03	1.248E-10	1.427E-03	1.523E-03	1.818E-03	1.589E-10	1.818E-03
	1.05	2.911E+01	2.842E-06	2.911E+01	3.709E+01	3.709E+01	3.621E-06	3.709E+01
2	1.05	2.911E+01	2.842E-06	2.911E+01	5.568E+02	5.568E+02	5.437E-05	5.568E+02
	7.50	4.129E+02	5.888E-05	4.129E+02	7.868E+03	7.899E+03	1.126E-03	7.899E+03
3	7.50	4.129E+02	5.888E-05	4.129E+02	1.222E+04	1.227E+04	1.750E-03	1.227E+04
	35.29	2.296E+03	4.239E-04	2.296E+03	4.491E+04	6.824E+04	1.260E-02	6.824E+04
4	35.29	2.296E+03	4.239E-04	2.296E+03	4.491E+04	6.824E+04	1.260E-02	6.824E+04
	63.08	3.085E+03	6.324E-04	3.085E+03	6.425E+04	9.168E+04	1.880E-02	9.168E+04
5	63.08	3.085E+03	6.324E-04	3.085E+03	6.425E+04	9.168E+04	1.880E-02	9.168E+04
	90.86	3.168E+03	6.100E-04	3.168E+03	6.759E+04	9.417E+04	1.813E-02	9.417E+04
6	90.86	3.168E+03	6.100E-04	3.168E+03	6.759E+04	9.417E+04	1.813E-02	9.417E+04
	118.65	2.990E+03	4.887E-04	2.990E+03	6.531E+04	8.888E+04	1.452E-02	8.888E+04
7	118.65	2.990E+03	4.887E-04	2.990E+03	6.531E+04	8.888E+04	1.452E-02	8.888E+04
	146.44	2.837E+03	5.007E-04	2.837E+03	5.905E+04	8.433E+04	1.488E-02	8.433E+04
8	146.44	2.837E+03	5.007E-04	2.837E+03	5.905E+04	8.433E+04	1.488E-02	8.433E+04
	174.23	2.879E+03	5.866E-04	2.879E+03	5.870E+04	8.557E+04	1.744E-02	8.557E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

2 x R.M.S

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
9	174.23	2.879E+03	5.866E-04	2.879E+03	5.870E+04	8.557E+04	1.744E-02	8.557E+04
	202.01	2.547E+03	5.408E-04	2.547E+03	4.924E+04	7.571E+04	1.607E-02	7.571E+04
10	202.01	2.547E+03	5.408E-04	2.547E+03	4.924E+04	7.571E+04	1.607E-02	7.571E+04
	229.80	1.548E+03	3.018E-04	1.548E+03	2.776E+04	4.601E+04	8.971E-03	4.601E+04
11	229.80	1.548E+03	3.018E-04	1.548E+03	2.776E+04	4.601E+04	8.971E-03	4.601E+04
	257.59	1.405E+02	2.281E-05	1.405E+02	4.102E+03	4.176E+03	6.779E-04	4.176E+03
12	257.59	1.405E+02	2.281E-05	1.405E+02	1.198E+03	1.220E+03	1.980E-04	1.220E+03
	262.64	1.650E+01	2.829E-06	1.650E+01	1.432E+02	1.432E+02	2.456E-05	1.432E+02
13	262.64	1.650E+01	2.829E-06	1.650E+01	7.131E+02	7.131E+02	1.223E-04	7.131E+02
	266.49	5.212E-05	7.929E-12	5.212E-05	1.670E-03	2.253E-03	3.427E-10	2.253E-03
MAXIMUM		3.168E+03	6.324E-04	3.168E+03	6.759E+04	9.417E+04	1.880E-02	9.417E+04

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MAXIMUM PEAKS

		POSITION				VELOCITY				ACCELERATION			
NODE	DISTNCE	Y	Z	RY	RZ	Y	Z	RY	RZ	Y	Z	RY	RZ
1	0.00	0.000	1.731	4.356	0.000	0.000	2.808	3.879	0.000	0.000	3.084	16.119	0.000
2	1.05	0.000	1.678	4.369	0.000	0.000	2.772	3.909	0.000	0.000	2.973	15.411	0.000
3	7.50	0.000	1.346	4.524	0.000	0.000	2.553	4.229	0.000	0.000	2.491	7.989	0.000
4	35.29	0.000	0.270	3.916	0.000	0.000	1.991	2.955	0.000	0.000	1.605	4.621	0.000
5	63.08	0.000	-0.271	3.513	0.000	0.000	1.339	2.425	0.000	0.000	1.506	3.959	0.000
6	90.86	0.000	-0.384	2.678	0.000	0.000	1.258	1.956	0.000	0.000	1.789	3.247	0.000
7	118.65	0.000	-0.636	2.549	0.000	0.000	1.206	2.028	0.000	0.000	2.051	3.077	0.000
8	146.44	0.000	-0.645	1.953	0.000	0.000	1.231	1.986	0.000	0.000	1.539	4.223	0.000
9	174.23	0.000	-0.782	1.900	0.000	0.000	1.175	2.383	0.000	0.000	1.357	3.694	0.000
10	202.01	0.000	-0.410	1.910	0.000	0.000	1.297	2.113	0.000	0.000	1.578	2.971	0.000
11	229.80	0.000	0.468	2.021	0.000	0.000	1.353	2.265	0.000	0.000	1.596	4.123	0.000
12	257.59	0.000	1.881	2.043	0.000	0.000	1.792	3.000	0.000	0.000	1.980	6.533	0.000
13	262.64	0.000	2.198	2.075	0.000	0.000	2.053	3.026	0.000	0.000	2.339	6.534	0.000
14	266.49	0.000	2.436	2.139	0.000	0.000	2.257	3.003	0.000	0.000	2.801	6.960	0.000
MAXIMUM		0.000	2.436	4.524	0.000	0.000	2.808	4.229	0.000	0.000	3.084	16.119	0.000

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MAXIMUM PEAKS

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
1	0.00	8.882E-03	2.544E-10	8.882E-03	1.132E-02	1.132E-02	3.242E-10	1.132E-02
	1.05	-2.918E+01	5.661E-06	-2.918E+01	1.961E+02	-3.718E+01	7.212E-06	-3.718E+01
2	1.05	-2.918E+01	5.661E-06	-2.918E+01	2.944E+03	-5.581E+02	1.083E-04	-5.581E+02
	7.50	7.321E+01	8.414E-05	7.321E+01	2.553E+04	1.401E+03	1.610E-03	1.401E+03
3	7.50	7.321E+01	8.414E-05	7.321E+01	3.967E+04	2.176E+03	2.501E-03	2.176E+03
	35.29	3.965E+03	6.132E-04	3.965E+03	1.224E+05	1.178E+05	1.822E-02	1.178E+05
4	35.29	3.965E+03	6.132E-04	3.965E+03	1.224E+05	1.178E+05	1.822E-02	1.178E+05
	63.08	5.372E+03	9.596E-04	5.372E+03	1.653E+05	1.597E+05	2.852E-02	1.597E+05
5	63.08	5.372E+03	9.596E-04	5.372E+03	1.653E+05	1.597E+05	2.852E-02	1.597E+05
	90.86	5.841E+03	9.962E-04	5.841E+03	1.736E+05	1.736E+05	2.961E-02	1.736E+05
6	90.86	5.841E+03	9.962E-04	5.841E+03	1.736E+05	1.736E+05	2.961E-02	1.736E+05
	118.65	5.649E+03	5.720E-04	5.649E+03	1.679E+05	1.679E+05	1.700E-02	1.679E+05
7	118.65	5.649E+03	5.720E-04	5.649E+03	1.679E+05	1.679E+05	1.700E-02	1.679E+05
	146.44	4.783E+03	6.936E-04	4.783E+03	1.422E+05	1.422E+05	2.061E-02	1.422E+05
8	146.44	4.783E+03	6.936E-04	4.783E+03	1.422E+05	1.422E+05	2.061E-02	1.422E+05
	174.23	5.173E+03	7.971E-04	5.173E+03	1.538E+05	1.538E+05	2.369E-02	1.538E+05

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MAXIMUM PEAKS

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
9	174.23	5.173E+03	7.971E-04	5.173E+03	1.538E+05	1.538E+05	2.369E-02	1.538E+05
	202.01	4.288E+03	8.489E-04	4.288E+03	1.274E+05	1.274E+05	2.523E-02	1.274E+05
10	202.01	4.288E+03	8.489E-04	4.288E+03	1.274E+05	1.274E+05	2.523E-02	1.274E+05
	229.80	2.580E+03	4.473E-04	2.580E+03	7.667E+04	7.667E+04	1.329E-02	7.667E+04
11	229.80	2.580E+03	4.473E-04	2.580E+03	7.667E+04	7.667E+04	1.329E-02	7.667E+04
	257.59	8.993E+01	3.814E-05	8.993E+01	1.314E+04	2.673E+03	1.134E-03	2.673E+03
12	257.59	8.993E+01	3.814E-05	8.993E+01	3.837E+03	7.808E+02	3.312E-04	7.808E+02
	262.64	-4.430E+01	5.762E-06	-4.430E+01	9.014E+02	-3.847E+02	5.003E-05	-3.847E+02
13	262.64	-4.430E+01	5.762E-06	-4.430E+01	4.487E+03	-1.915E+03	2.491E-04	-1.915E+03
	266.49	1.118E-04	1.828E-11	1.118E-04	5.585E-03	4.833E-03	7.899E-10	4.833E-03
MAXIMUM		5.841E+03	9.962E-04	5.841E+03	1.736E+05	1.736E+05	2.961E-02	1.736E+05

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MINIMUM PEAKS

		POSITION				VELOCITY				ACCELERATION			
NODE	DISTNCE	Y	Z	RY	RZ	Y	Z	RY	RZ	Y	Z	RY	RZ
1	0.00	0.000	-7.009	-4.941	0.000	0.000	-2.946	-3.985	0.000	0.000	-7.151	-12.881	0.000
2	1.05	0.000	-6.918	-4.923	0.000	0.000	-2.892	-3.946	0.000	0.000	-7.005	-12.610	0.000
3	7.50	0.000	-6.558	-4.588	0.000	0.000	-2.573	-3.611	0.000	0.000	-6.024	-10.900	0.000
4	35.29	0.000	-5.405	-3.526	0.000	0.000	-1.474	-2.436	0.000	0.000	-2.500	-7.851	0.000
5	63.08	0.000	-5.694	-2.619	0.000	0.000	-1.143	-2.384	0.000	0.000	-2.472	-4.960	0.000
6	90.86	0.000	-6.463	-2.600	0.000	0.000	-1.127	-1.974	0.000	0.000	-1.925	-4.034	0.000
7	118.65	0.000	-6.418	-2.332	0.000	0.000	-1.307	-1.831	0.000	0.000	-1.711	-3.582	0.000
8	146.44	0.000	-6.183	-2.977	0.000	0.000	-1.370	-2.016	0.000	0.000	-1.726	-3.184	0.000
9	174.23	0.000	-5.438	-2.992	0.000	0.000	-1.573	-1.724	0.000	0.000	-1.648	-4.188	0.000
10	202.01	0.000	-5.192	-3.318	0.000	0.000	-1.895	-1.703	0.000	0.000	-1.645	-3.346	0.000
11	229.80	0.000	-5.159	-3.785	0.000	0.000	-2.452	-2.595	0.000	0.000	-1.731	-3.515	0.000
12	257.59	0.000	-5.362	-4.011	0.000	0.000	-3.053	-3.263	0.000	0.000	-2.125	-5.993	0.000
13	262.64	0.000	-5.437	-3.989	0.000	0.000	-3.216	-3.324	0.000	0.000	-2.609	-6.265	0.000
14	266.49	0.000	-5.499	-3.930	0.000	0.000	-3.347	-3.387	0.000	0.000	-3.056	-7.146	0.000
MINIMUM		0.000	-7.009	-4.941	0.000	0.000	-3.347	-3.985	0.000	0.000	-7.151	-12.881	0.000

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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MINIMUM PEAKS

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
1	0.00	-4.362E-03	-3.901E-10	-4.362E-03	1.427E-11	-5.558E-03	-4.970E-10	-5.558E-03
	1.05	-1.539E+02	-4.409E-06	-1.539E+02	3.718E+01	-1.961E+02	-5.617E-06	-1.961E+02
2	1.05	-1.539E+02	-4.408E-06	-1.539E+02	5.581E+02	-2.944E+03	-8.433E-05	-2.944E+03
	7.50	-1.335E+03	-1.097E-04	-1.335E+03	2.516E+02	-2.553E+04	-2.099E-03	-2.553E+04
3	7.50	-1.335E+03	-1.097E-04	-1.335E+03	3.910E+02	-3.967E+04	-3.262E-03	-3.967E+04
	35.29	-4.117E+03	-6.613E-04	-4.117E+03	6.768E+01	-1.224E+05	-1.966E-02	-1.224E+05
4	35.29	-4.117E+03	-6.613E-04	-4.117E+03	6.768E+01	-1.224E+05	-1.966E-02	-1.224E+05
	63.08	-5.562E+03	-9.418E-04	-5.562E+03	1.338E+02	-1.653E+05	-2.799E-02	-1.653E+05
5	63.08	-5.562E+03	-9.418E-04	-5.562E+03	1.338E+02	-1.653E+05	-2.799E-02	-1.653E+05
	90.86	-4.302E+03	-9.998E-04	-4.302E+03	4.135E+01	-1.279E+05	-2.972E-02	-1.279E+05
6	90.86	-4.302E+03	-9.998E-04	-4.302E+03	4.135E+01	-1.279E+05	-2.972E-02	-1.279E+05
	118.65	-3.041E+03	-6.869E-04	-3.041E+03	1.989E+00	-9.039E+04	-2.042E-02	-9.039E+04
7	118.65	-3.041E+03	-6.869E-04	-3.041E+03	1.990E+00	-9.039E+04	-2.042E-02	-9.039E+04
	146.44	-3.920E+03	-8.503E-04	-3.920E+03	4.520E+01	-1.165E+05	-2.527E-02	-1.165E+05
8	146.44	-3.920E+03	-8.503E-04	-3.920E+03	4.520E+01	-1.165E+05	-2.527E-02	-1.165E+05
	174.23	-3.760E+03	-8.305E-04	-3.760E+03	1.219E+02	-1.117E+05	-2.468E-02	-1.117E+05

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

MINIMUM PEAKS

ELEM	DISTNCE	Y(LATERAL) BND MOMENT	Z(VERTICAL) BND MOMENT	MAXIMUM BND MOMENT	MAX BND STRESS	Y(LAT)BND STRESS	Z(VER)BND STRESS	MAX SG BND STRESS
9	174.23	-3.760E+03	-8.305E-04	-3.760E+03	1.219E+02	-1.117E+05	-2.468E-02	-1.117E+05
	202.01	-2.892E+03	-8.903E-04	-2.892E+03	2.312E+01	-8.596E+04	-2.646E-02	-8.596E+04
10	202.01	-2.892E+03	-8.903E-04	-2.892E+03	2.312E+01	-8.596E+04	-2.646E-02	-8.596E+04
	229.80	-2.332E+03	-4.775E-04	-2.332E+03	6.220E+00	-6.930E+04	-1.419E-02	-6.930E+04
11	229.80	-2.332E+03	-4.775E-04	-2.332E+03	6.220E+00	-6.930E+04	-1.419E-02	-6.930E+04
	257.59	-4.419E+02	-2.976E-05	-4.419E+02	2.854E+01	-1.314E+04	-8.844E-04	-1.314E+04
12	257.59	-4.419E+02	-2.976E-05	-4.419E+02	8.336E+00	-3.837E+03	-2.584E-04	-3.837E+03
	262.64	-1.038E+02	-3.182E-06	-1.038E+02	3.847E+02	-9.014E+02	-2.763E-05	-9.014E+02
13	262.64	-1.038E+02	-3.182E-06	-1.038E+02	1.915E+03	-4.487E+03	-1.375E-04	-4.487E+03
	266.49	-1.292E-04	-3.783E-11	-1.292E-04	2.079E-10	-5.585E-03	-1.635E-09	-5.585E-03
MINIMUM		-5.562E+03	-9.998E-04	-5.562E+03	1.427E-11	-1.653E+05	-2.972E-02	-1.653E+05

* * * * T E T H E R 1 S T A T I S T I C S * * * *

ELEMENT	1		2		3		4		5		6		7		8		9		10	
DISTANCE	0	1	1	8	8	35	35	63	63	91	91	119	119	146	146	174	174	202	202	230
BIN STRESS RANGE	PROBABILITY DISTRIBUTION(1/2 CYCLES)																			
1 0.00-6.9446E+03	478	278	278	168	130	44	44	30	30	45	45	38	38	50	50	36	36	28	28	60
2 6.94-1.3889E+04	0	0	0	75	65	34	34	22	22	0	0	16	16	22	22	16	16	24	24	35
3 1.39-2.0834E+04	0	0	0	26	47	23	23	9	9	11	11	14	14	12	12	2	2	12	12	31
4 2.08-2.7778E+04	0	0	0	5	19	16	16	6	6	6	6	12	12	18	18	11	11	10	10	12
5 2.78-3.4723E+04	0	0	0	0	10	6	6	4	4	9	9	7	7	4	4	7	7	5	5	13
6 3.47-4.1667E+04	0	0	0	0	2	11	11	7	7	14	14	6	6	7	7	7	7	2	2	12
7 4.17-4.8612E+04	0	0	0	0	1	11	11	4	4	4	4	4	4	4	4	5	5	7	7	12
8 4.86-5.5557E+04	0	0	0	0	0	6	6	4	4	4	4	6	6	6	6	6	6	5	5	10
9 5.56-6.2501E+04	0	0	0	0	0	9	9	7	7	3	3	2	2	5	5	4	4	5	5	13
10 6.25-6.9446E+04	0	0	0	0	0	9	9	11	11	5	5	0	0	3	3	2	2	9	9	13
11 6.94-7.6390E+04	0	0	0	0	0	14	14	9	9	5	5	4	4	3	3	6	6	6	6	14
12 7.64-8.3335E+04	0	0	0	0	0	15	15	6	6	0	0	3	3	6	6	6	6	8	8	5
13 8.33-9.0280E+04	0	0	0	0	0	9	9	5	5	6	6	3	3	6	6	4	4	10	10	12
14 9.03-9.7224E+04	0	0	0	0	0	6	6	12	12	5	5	3	3	6	6	3	3	5	5	5
15 9.72-1.0417E+05	0	0	0	0	0	4	4	6	6	4	4	6	6	6	6	5	5	8	8	3
16 1.04-1.1111E+05	0	0	0	0	0	8	8	2	2	10	10	5	5	3	3	7	7	5	5	3
17 1.11-1.1806E+05	0	0	0	0	0	4	4	7	7	3	3	9	9	3	3	3	3	3	3	0
18 1.18-1.2500E+05	0	0	0	0	0	2	2	3	3	6	6	4	4	3	3	6	6	3	3	1
19 1.25-1.3195E+05	0	0	0	0	0	2	2	2	2	1	1	5	5	5	5	4	4	3	3	0
20 1.32-1.3889E+05	0	0	0	0	0	2	2	3	3	7	7	4	4	3	3	5	5	5	5	0
21 1.39-1.4584E+05	0	0	0	0	0	2	2	2	2	3	3	4	4	3	3	4	4	4	4	0
22 1.46-1.5278E+05	0	0	0	0	0	0	0	4	4	2	2	6	6	2	2	0	0	7	7	0
23 1.53-1.5973E+05	0	0	0	0	0	0	0	2	2	3	3	2	2	1	1	0	0	2	2	0
24 1.60-1.6667E+05	0	0	0	0	0	0	0	3	3	2	2	1	1	0	0	3	3	5	5	0
25 1.67-1.7361E+05	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	1	1	2	2	0
26 1.74-1.8056E+05	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	2	2	1	1	0
27 1.81-1.8750E+05	0	0	0	0	0	1	1	1	1	0	0	2	2	4	4	2	2	1	1	0
28 1.88-1.9445E+05	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0
29 1.94-2.0139E+05	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	1	1	0
30 2.01-2.0834E+05	0	0	0	0	0	0	0	0	0	1	1	2	2	0	0	3	3	0	0	0
31 2.08-2.1528E+05	0	0	0	0	0	2	2	0	0	2	2	0	0	3	3	2	2	0	0	0
32 2.15-2.2223E+05	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0
33 2.22-2.2917E+05	0	0	0	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0
34 2.29-2.3612E+05	0	0	0	0	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0
35 2.36-2.4306E+05	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0
36 2.43-2.5000E+05	0	0	0	0	0	0	0	2	2	1	1	0	0	1	1	0	0	0	0	0
37 2.50-2.5695E+05	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
38 2.57-2.6389E+05	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0
39 2.64-2.7084E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
40 2.71-2.7778E+05	0	0	0	0	0	0	0	1	1	2	2	0	0	0	0	0	0	0	0	0
41 2.78-2.8473E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 2.85-2.9167E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43 2.92-2.9862E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44 2.99-3.0556E+05	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
45 3.06-3.1251E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46 3.13-3.1945E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47 3.19-3.2640E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48 3.26-3.3334E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 3.33-3.4028E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 3.40-3.4723E+05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* * * * T E T H E R 1 S T A T I S T I C S * * * *
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ELEMENT	11		12		13	
DISTANCE	230	258	258	263	263	266
BIN STRESS RANGE	PROBABILITY DISTRIBUTION(1/2 CYCLES)					
1 0.00-6.9446E+03	60	234	270	314	314	450
2 6.94-1.3889E+04	35	36	0	0	0	0
3 1.39-2.0834E+04	31	0	0	0	0	0
4 2.08-2.7778E+04	12	0	0	0	0	0
5 2.78-3.4723E+04	13	0	0	0	0	0
6 3.47-4.1667E+04	12	0	0	0	0	0
7 4.17-4.8612E+04	12	0	0	0	0	0
8 4.86-5.5557E+04	10	0	0	0	0	0
9 5.56-6.2501E+04	13	0	0	0	0	0
10 6.25-6.9446E+04	13	0	0	0	0	0
11 6.94-7.6390E+04	14	0	0	0	0	0
12 7.64-8.3335E+04	5	0	0	0	0	0
13 8.33-9.0280E+04	12	0	0	0	0	0
14 9.03-9.7224E+04	5	0	0	0	0	0
15 9.72-1.0417E+05	3	0	0	0	0	0
16 1.04-1.1111E+05	3	0	0	0	0	0
17 1.11-1.1806E+05	0	0	0	0	0	0
18 1.18-1.2500E+05	1	0	0	0	0	0
19 1.25-1.3195E+05	0	0	0	0	0	0
20 1.32-1.3889E+05	0	0	0	0	0	0
21 1.39-1.4584E+05	0	0	0	0	0	0
22 1.46-1.5278E+05	0	0	0	0	0	0
23 1.53-1.5973E+05	0	0	0	0	0	0
24 1.60-1.6667E+05	0	0	0	0	0	0
25 1.67-1.7361E+05	0	0	0	0	0	0
26 1.74-1.8056E+05	0	0	0	0	0	0
27 1.81-1.8750E+05	0	0	0	0	0	0
28 1.88-1.9445E+05	0	0	0	0	0	0
29 1.94-2.0139E+05	0	0	0	0	0	0
30 2.01-2.0834E+05	0	0	0	0	0	0
31 2.08-2.1528E+05	0	0	0	0	0	0
32 2.15-2.2223E+05	0	0	0	0	0	0
33 2.22-2.2917E+05	0	0	0	0	0	0
34 2.29-2.3612E+05	0	0	0	0	0	0
35 2.36-2.4306E+05	0	0	0	0	0	0
36 2.43-2.5000E+05	0	0	0	0	0	0
37 2.50-2.5695E+05	0	0	0	0	0	0
38 2.57-2.6389E+05	0	0	0	0	0	0
39 2.64-2.7084E+05	0	0	0	0	0	0
40 2.71-2.7778E+05	0	0	0	0	0	0
41 2.78-2.8473E+05	0	0	0	0	0	0
42 2.85-2.9167E+05	0	0	0	0	0	0
43 2.92-2.9862E+05	0	0	0	0	0	0
44 2.99-3.0556E+05	0	0	0	0	0	0
45 3.06-3.1251E+05	0	0	0	0	0	0
46 3.13-3.1945E+05	0	0	0	0	0	0
47 3.19-3.2640E+05	0	0	0	0	0	0
48 3.26-3.3334E+05	0	0	0	0	0	0
49 3.33-3.4028E+05	0	0	0	0	0	0
50 3.40-3.4723E+05	0	0	0	0	0	0

* * * * T E T H E R 1 S T A T I S T I C S * * * *

RECORDS 50(TIME= 24.75) TO 751(TIME= 375.00) PROCESSED

PARAMETER SUMMARY FOR FATIGUE ANALYSIS/MAXIMUM STRESS

Elapsed time(seconds)	350.250
Stress Cutoff value (S0)	0.0000E+00
Stress concentration factor	1.2400
SN curve intercept coefficient A	1.3367E+24
SN curve slope-m	3.5000
Thickness Effect Value.	0.0000

	BENDING MOMENTS*					FATIGUE			* MAX BENDING STRESS					
			SIGNIFICANT		*EFFECTVE	PN.	CYC	DAMAGE	FATIGUE*			PN.	CYC	3HR PK
ELEM	DISTNCE	Y	Z	MAX DAM*	STRS RNG	(DEG)	/HR	/HR	LIFE-DYS*	MAX PK	MEAN	SIGNFCNT(DEG)	/HR	STRESS
1	0.00	1.43E-03	1.25E-10	1.43E-03	4.31E+03	0	2457	9.63E-09	99999.0	1.13E-02	1.73E-05	1.82E-03	0	2467 3.85E-03
	1.05	2.91E+01	2.84E-06	2.91E+01	4.31E+03	0	1429	5.60E-09	99999.0	1.96E+02	-1.46E+02	3.71E+01	0	1439 2.22E+02
2	1.05	2.91E+01	2.84E-06	2.91E+01	4.31E+03	0	1429	5.60E-09	99999.0	2.94E+03	-2.19E+03	5.57E+02	0	1439 3.33E+03
	7.50	4.13E+02	5.89E-05	4.13E+02	1.36E+04	0	1408	3.12E-07	99999.0	2.55E+04	-1.31E+04	7.90E+03	0	1418 2.92E+04
3	7.50	4.13E+02	5.89E-05	4.13E+02	2.12E+04	0	1408	1.45E-06	28671.1	3.97E+04	-2.04E+04	1.23E+04	0	1418 4.54E+04
	35.29	2.30E+03	4.24E-04	2.30E+03	1.10E+05	0	1254	4.14E-04	100.6	1.22E+05	6.97E+03	6.82E+04	0	1264 1.45E+05
4	35.29	2.30E+03	4.24E-04	2.30E+03	1.10E+05	0	1254	4.14E-04	100.6	1.22E+05	6.97E+03	6.82E+04	0	1264 1.45E+05
	63.08	3.08E+03	6.32E-04	3.08E+03	1.49E+05	0	925	8.76E-04	47.6	1.65E+05	2.13E+04	9.17E+04	0	935 2.04E+05
5	63.08	3.08E+03	6.32E-04	3.08E+03	1.49E+05	0	925	8.76E-04	47.6	1.65E+05	2.13E+04	9.17E+04	0	935 2.04E+05
	90.86	3.17E+03	6.10E-04	3.17E+03	1.54E+05	0	869	9.28E-04	44.9	1.74E+05	2.69E+04	9.42E+04	0	874 2.14E+05
6	90.86	3.17E+03	6.10E-04	3.17E+03	1.54E+05	0	869	9.28E-04	44.9	1.74E+05	2.69E+04	9.42E+04	0	874 2.14E+05
	118.65	2.99E+03	4.89E-04	2.99E+03	1.42E+05	0	894	7.20E-04	57.8	1.68E+05	2.73E+04	8.89E+04	0	904 2.04E+05
7	118.65	2.99E+03	4.89E-04	2.99E+03	1.42E+05	0	894	7.20E-04	57.8	1.68E+05	2.73E+04	8.89E+04	0	904 2.04E+05
	146.44	2.84E+03	5.01E-04	2.84E+03	1.30E+05	0	997	5.87E-04	71.0	1.42E+05	2.47E+04	8.43E+04	0	1007 1.94E+05
8	146.44	2.84E+03	5.01E-04	2.84E+03	1.30E+05	0	997	5.87E-04	71.0	1.42E+05	2.47E+04	8.43E+04	0	1007 1.94E+05
	174.23	2.88E+03	5.87E-04	2.88E+03	1.37E+05	0	838	5.97E-04	69.8	1.54E+05	2.07E+04	8.56E+04	0	843 1.90E+05
9	174.23	2.88E+03	5.87E-04	2.88E+03	1.37E+05	0	838	5.97E-04	69.8	1.54E+05	2.07E+04	8.56E+04	0	843 1.90E+05
	202.01	2.55E+03	5.41E-04	2.55E+03	1.24E+05	0	956	4.80E-04	86.8	1.27E+05	1.52E+04	7.57E+04	0	966 1.66E+05
10	202.01	2.55E+03	5.41E-04	2.55E+03	1.24E+05	0	956	4.80E-04	86.8	1.27E+05	1.52E+04	7.57E+04	0	966 1.66E+05
	229.80	1.55E+03	3.02E-04	1.55E+03	7.03E+04	0	1305	8.98E-05	463.9	7.67E+04	7.06E+03	4.60E+04	0	1316 1.01E+05
11	229.80	1.55E+03	3.02E-04	1.55E+03	7.03E+04	0	1305	8.98E-05	463.9	7.67E+04	7.06E+03	4.60E+04	0	1316 1.01E+05
	257.59	1.40E+02	2.28E-05	1.40E+02	7.54E+03	0	1388	3.86E-08	99999.0	1.31E+04	-4.36E+03	4.18E+03	0	1398 1.29E+04
12	257.59	1.40E+02	2.28E-05	1.40E+02	4.31E+03	0	1388	5.44E-09	99999.0	3.84E+03	-1.27E+03	1.22E+03	0	1398 3.77E+03
	262.64	1.65E+01	2.83E-06	1.65E+01	4.31E+03	0	1614	6.32E-09	99999.0	9.01E+02	-6.87E+02	1.43E+02	0	1624 9.82E+02
13	262.64	1.65E+01	2.83E-06	1.65E+01	4.31E+03	0	1614	6.32E-09	99999.0	4.49E+03	-3.42E+03	7.13E+02	0	1624 4.89E+03
	266.49	5.21E-05	7.93E-12	5.21E-05	4.31E+03	0	2313	9.06E-09	99999.0	5.59E-03	3.68E-05	2.25E-03	0	2323 4.78E-03
		3.17E+03	6.32E-04	3.17E+03	1.54E+05	0	1614	9.28E-04	44.9	1.74E+05	8.76E+03	9.42E+04	0	1624 2.14E+05
ALONG TETHER		MAXIMUM	MAXIMUM	MAXIMUM	MAXIMUM	MEAN	MAX	MAXIMUM	MINIMUM	MAXIMUM	MEAN	MAXIMUM MEAN		MAX MAXIMUM

INSTALLED TETHER EXAMPLE - SELECTED OUTPUT LISTING

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JOB MINT  NAUT
TITLE               Simple Tether Model - Tubes and Tethers
OPTIONS END


AQWA-NAUT    VERSION 5.4A 17-JUL-03
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```
 AAAAAA    QQQQQQ   WW      WW   AAAAAA         NN      NN   AAAAAA   UU     UU   TTTTTTTT
AAAAAAAA  QQQQQQQQ  WW      WW  AAAAAAAA        NNN     NN  AAAAAAAA  UU     UU  TTTTTTTTTT
AA    AA  QQ    QQ  WW      WW  AA    AA        NNNN    NN  AA    AA  UU     UU      TT
AA    AA  QQ    QQ  WW      WW  AA    AA        NNNNN   NN  AA    AA  UU     UU      TT
AAAAAAAA  QQ    QQ  WW      WW  AAAAAAAA  IIII  NN NNN  NN  AAAAAAAA  UU     UU      TT
AAAAAAAA  QQ    QQ  WW  WW  WW  AAAAAAAA  IIII  NN  NNN NN  AAAAAAAA  UU     UU      TT
AA    AA  QQ    QQ  WW  WW  WW  AA    AA        NN   NNNNN  AA    AA  UU     UU      TT
AA    AA  QQ QQ QQ  WW  WW  WW  AA    AA        NN    NNNN  AA    AA  UU     UU      TT
AA    AA  QQQQQQQQ  WWWWWWWWWW  AA    AA        NN     NNN  AA    AA  UUUUUUUUU     TTTT
AA    AA   QQQQQQ    WWWWWWWW   AA    AA        NN      NN  AA    AA   UUUUUUU      TTTT
             QQ
```

THE DEVELOPMENT OF THE AQWA SUITE IS NOW CONDUCTED BY
CENTURY DYNAMICS LIMITED
WHO ARE CONTINUALLY IMPROVING THE CAPABILITIES OF THE
HYDRODYNAMIC CALCULATIONS AS MORE ADVANCED TECHNIQUES
BECOME AVAILABLE. SUGGESTIONS FROM USERS REGARDING
DEVELOPMENT WILL BE WELCOMED.

CENTURY DYNAMICS LIMITED
DYNAMICS HOUSE
HURST ROAD
HORSHAM
WEST SUSSEX RH12 2DT
ENGLAND

JOB TITLE : Simple Tether Model - Tubes and Tethers

```
    DECK  1
    -------


    DECK  2
    -------


    DECK  2
    -------


    DECK  3
    -------


    DECK  4
    -------


    DECK  5
    -------
    05DPTH    345.00      0.00      0.00      0.00      0.00      0.00
    05DENS      1.02      0.00      0.00      0.00      0.00      0.00
END05ACCG       9.81      0.00      0.00      0.00      0.00      0.00
```

* * * * C O O R D I N A T E D A T A * * * *
- - - - - - - - - - - - - - - - -

INPUT SEQUENCE	NODE NO.	X	Y	Z
1	11	40.000	40.000	0.000
2	12	40.000	40.000	28.500
3	13	40.000	40.000	57.000
4	14	40.000	40.000	85.500
5	15	40.000	40.000	114.000
6	19	41.000	40.000	0.000
7	21	-40.000	40.000	0.000
8	22	-40.000	40.000	28.500
9	23	-40.000	40.000	57.000
10	24	-40.000	40.000	85.500
11	25	-40.000	40.000	114.000
12	29	-41.000	40.000	0.000
13	31	-40.000	-40.000	0.000
14	32	-40.000	-40.000	28.500
15	33	-40.000	-40.000	57.000
16	34	-40.000	-40.000	85.500
17	35	-40.000	-40.000	114.000
18	39	-41.000	-40.000	0.000
19	41	40.000	-40.000	0.000
20	42	40.000	-40.000	28.500
21	43	40.000	-40.000	57.000
22	44	40.000	-40.000	85.500
23	45	40.000	-40.000	114.000
24	49	41.000	-40.000	0.000
25	51	-28.338	47.430	8.124
26	52	28.338	47.430	8.124
27	59	-28.338	47.430	9.124
28	61	-47.430	-28.338	8.124
29	62	-47.430	28.338	8.124
30	69	-47.430	-28.338	9.124
31	71	-28.338	-47.430	8.124
32	72	28.338	-47.430	8.124
33	79	-28.338	-47.430	9.124
34	81	47.430	-28.338	8.124
35	82	47.430	28.338	8.124
36	89	47.430	-28.338	9.124
37	111	52.730	52.730	-329.730
38	112	52.730	52.730	12.850
39	121	-52.730	52.730	-329.730
40	122	-52.730	52.730	12.850
41	131	-52.730	-52.730	-329.730
42	132	-52.730	-52.730	12.850
43	141	52.730	-52.730	-329.730
44	142	52.730	-52.730	12.850
45	999	0.000	0.000	63.600

* * * * C O O R D I N A T E D A T A * * * *
- - - - - - - - - - - - - - - - -

INPUT SEQUENCE	NODE NO.	X	Y	Z
46	101	-52.630	52.630	-64.150
47	102	-52.630	52.630	-152.618
48	103	-52.630	52.630	-241.087
49	104	-52.630	52.630	-329.556
50	201	-52.630	-52.630	-64.150
51	202	-52.630	-52.630	-152.618
52	203	-52.630	-52.630	-241.087
53	204	-52.630	-52.630	-329.556
54	301	52.630	-52.630	-64.150
55	302	52.630	-52.630	-152.618
56	303	52.630	-52.630	-241.087
57	304	52.630	-52.630	-329.556
58	401	52.630	52.630	-64.150
59	402	52.630	52.630	-152.618
60	403	52.630	52.630	-241.087
61	404	52.630	52.630	-329.556
62	1010	-52.630	52.630	12.850
63	1020	-52.630	-52.630	12.850
64	1030	52.630	-52.630	12.850
65	1040	52.630	52.630	12.850
66	9010	-52.630	52.630	-329.735
67	9020	-52.630	-52.630	-329.735
68	9030	52.630	-52.630	-329.735
69	9040	52.630	52.630	-329.735

* * * * E L E M E N T T O P O L O G Y F O R S T R U C T U R E 1 * * * *

ELEMENT NUMBER	TYPE	NODE NUMBER	NODE NUMBER	NODE NUMBER	NODE NUMBER	MATERIAL NUMBER	GEOMETRY NUMBER
1	PMAS	999	0	0	0	1	1
2	TUBE	11	12	0	0	2	2
3	TUBE	12	13	0	0	2	2
4	TUBE	13	15	0	0	2	2
5	TUBE	21	22	0	0	2	2
6	TUBE	22	23	0	0	2	2
7	TUBE	23	25	0	0	2	2
8	TUBE	31	32	0	0	2	2
9	TUBE	32	33	0	0	2	2
10	TUBE	33	35	0	0	2	2
11	TUBE	41	42	0	0	2	2
12	TUBE	42	43	0	0	2	2
13	TUBE	43	45	0	0	2	2
14	TUBE	51	52	0	0	2	3
15	TUBE	61	62	0	0	2	3
16	TUBE	71	72	0	0	2	3
17	TUBE	81	82	0	0	2	3

* * * * M A T E R I A L P R O P E R T I E S * * * *
- - - - - - - - - - - - - - - - - - - -

MATERIAL GROUP NUMBER	DENSITY/PARAM 1	PARAM 2	PARAM 3
1	2.6880E+05	0.0000E+00	0.0000E+00
2	1.0000E-10	0.0000E+00	0.0000E+00
101	7.8169E+00	2.1500E+08	0.0000E+00

* * * * G E O M E T R I C P R O P E R T I E S * * * *

INPUT SEQUENCE	GEOMETRY GROUP NO.	ELEMENT TYPE	G E O M E T R I C P A R A M E T E R N U M B E R 1	2	3	4	5	6	DRAG COEFFICIENT C D	ADDED MASS COEFFICIENT C M
1	1	PMAS	1.0339E+09	0.0000E+00	0.0000E+00	9.5290E+08	0.0000E+00	7.3490E+08	0.00	0.00
2	2	TUBE	31.100	0.100000	0.000	0.000	0.000		0.75	1.00
3	3	TUBE	13.000	0.100000	0.000	0.000	0.000		0.75	1.48
4	101	TUBE	1.118	0.038000	0.000	0.000	0.000		0.75	1.00

```
        * * * * G L O B A L   P A R A M E T E R S * * * *
              - - - - - - - - - - - - - - - - - -

WATER  DEPTH  . . . . . . . . . . . . . . . . =   345.000

DENSITY  OF  WATER  . . . . . . . . . . . . . =     1.025

ACCELERATION  DUE  TO GRAVITY . . . . . . . . =     9.810
```

* * * * * * * * * MASS AND INERTIA PROPERTIES OF STRUCTURE 1 * * * * * * * * *

ELEMENT TYPE	NUMBER OF ELEMENTS	MASS	WEIGHT
TUBE	16	5.3597E-07	5.2579E-06
PMAS	1	2.6880E+05	2.6369E+06
T O T A L	17	2.6880E+05	2.6369E+06

	X	Y	Z
CENTRE OF GRAVITY	0.000	0.000	63.600
INERTIA MATRIX	1.034E+09	7.999E-12	2.790E-11
	7.999E-12	9.529E+08	-5.591E-11
	2.790E-11	-5.591E-11	7.349E+08

```
DECK  6.1
---------

DECK  7.1
---------


DECK  8
-------
```

* * * * W A V E F R E Q U E N C I E S / P E R I O D S A N D D I R E C T I O N S * * * *

STRUCTURE	FREQUENCY (RAD/SEC)	FREQUENCY (HERTZ)	PERIOD (SECONDS)	WAVE NUMBER	WAVE LENGTH	MAX ELEM SIZE	DEPTH RATIO D/L	DEPTH RATIO K*D	PARAMETERS
	FREQUENCIES *UNDEFINED*								
1	DIRECTIONS *UNDEFINED*								

```
DECK  9
-------


DECK 10.1
-------


DECK 11
-------


DECK 12
-------


DECK 13N
--------

    13WAMP    0    0    15.000     0.000     0.000     0.000     0.000     0.000
    13PERD    0    0    15.000     0.000     0.000     0.000     0.000     0.000
 END13WVDN    0    0     0.000     0.000     0.000     0.000     0.000     0.000

DECK 14
-------

    14TSLK    0    0    0    0 1.000E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TEIG   16    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  104  103  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  103  102  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  102  101  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TEGR    4    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TCAP    0    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TIMP    0    0    0    0 3.000E+05 2.500E+00 0.000E+00 0.000E+00 0.000E+00
    14TLOW    0    0    0    0 1.000E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TSPV    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TSPA    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TETH    1 1010    0 9010 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  204  203  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  203  202  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  202  201  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TEGR    4    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TCAP    0    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TIMP    0    0    0    0 3.000E+05 2.500E+00 0.000E+00 0.000E+00 0.000E+00
    14TLOW    0    0    0    0 1.000E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TSPV    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TSPA    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TETH    1 1020    0 9020 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  304  303  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  303  302  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  302  301  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TEGR    4    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TCAP    0    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TIMP    0    0    0    0 3.000E+05 2.500E+00 0.000E+00 0.000E+00 0.000E+00
    14TLOW    0    0    0    0 1.000E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TSPV    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TSPA    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TETH    1 1030    0 9030 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  404  403  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  403  402  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TELM  402  401  101  101 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TEGR    4    0    0    0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TIMP    0    0    0    0 3.000E+05 2.500E+00 0.000E+00 0.000E+00 0.000E+00
    14TLOW    0    0    0    0 1.000E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00
    14TSPV    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
    14TSPA    0    0    0    0 0.000E+00 5.730E+03 5.730E+03 0.000E+00 0.000E+00
 END14TETH    1 1040    0 9040 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
DECK 15
-------

    15POS1            -46.000     0.000   -17.400     0.000     0.000     0.000
 END15VEL1              0.000     0.000     0.000     0.000     0.000     0.000

DECK 16
-------

 END16TIME    0  101     0.250     0.000     0.000     0.000     0.000     0.000

DECK 17
-------


DECK 18
-------
```

```
       18PREV   10
       18TGRV    2
       18PTEN    1
       18NODE    1  112
       18NOPR    1    4
       18NOPR    1    5
       18NOPR    1    6
       18NOPR    1   15
       18NOPR    1   16
       18NOPR    1   17
       18NOPR    1   19
       18NOPR    1   23
       18NOPR    1   25
    END18PRNT    1   49

   DECK 19
   -------

   DECK 20
   -------
```

```
* * * *W I N D / C U R R E N T   L O A D S   F O R   U N I T   A M P L I T U D E / V E L O C I T Y* * * *
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    * * * *A N D   T H R U S T E R   F O R C E S   F O R   S T R U C T U R E   1* * * *
     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
* * * * E N V I R O N M E N T A L   P A R A M E T E R S * * * *
      - - - - - - - - - - - - - - - - - - - - - - - - -

  UNIFORM CURRENT VELOCITY    . . . . . . . . . =     0.000

  UNIFORM CURRENT DIRECTION   . . . . . . . . . =     0.000

  UNIFORM WIND VELOCITY . .   . . . . . . . . . =     0.000

  UNIFORM WIND DIRECTION  .   . . . . . . . . . =     0.000

                              NO PROFILED CURRENT
                              -------------------
```

* * * * C O N S T R A I N T S * * * *
- - - - - - - - - - - -

STRUCTURE NUMBER	ACTIVE FREEDOMS TABLE X	Y	Z	RX	RY	RZ
1	X	X	X	X	X	X

**** REGULAR WAVE PARAMETERS AND INITIAL DAMPING FACTORS ****

WAVE FREQUENCY(RADIANS/SEC) - - - - - =	0.41888
WAVE FREQUENCY(HERTZ) - - - - - - - - =	0.06667
WAVE NUMBER - - - - - - - - - - - - - =	0.01789
WAVE AMPLITUDE - - - - - - - - - - - =	15.00
WAVE HEIGHT - - - - - - - - - - - - - =	30.00
WAVE PERIOD - - - - - - - - - - - - - =	15.00
WAVE LENGTH - - - - - - - - - - - - - =	351.29
WAVE CELERITY - - - - - - - - - - - - =	23.42
WAVE SLOPE (1 IN) - - - - - - - - - =	11.71
WAVE DIRECTION - - - - - - - - - - - =	0.00
DAMPING DECAY FACTOR ZERO AT TIME - - =	0.00
TYPE OF WAVE THEORY - - - - - - - - - =	STOKES2(D/W)

PROGRAM AQWA-NAUT JOB CODE-MINT TITLE-Simple Tether Model - Tubes and Tethers

**** DESCRIPTION OF TENSION LEG TETHER 1****

TETHER NODE	ELEVATION	NODE 1	NODE 2	MATE GROUP	GEOM GROUP	X-SECT AREA	2ND-MOM OF AREA	EI	EA	CAP AREA	EXTERNAL DIAM	AREA	INLINE/ VERTICAL	X ROT COIL	Y ROT COIL
		ELEMENT DESCRIPTION								EXT AREA			SPRINGS/CONSTRAINTS		
4	265.4									0.000			1.00E+15	5.73E+03	5.73E+03
		102	101	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
3	176.9														
		103	102	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
2	88.5														
		104	103	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
1	0.0									0.000			1.00E+15	5.73E+03	5.73E+03

TETHER CONFIGURATION- . . . . . = INSTALLED

VESSEL ATTACHMENT - NODE NUMBER . . . . . = 1010
- POSITION IN FRA . . . . = -52.630 52.630 12.850
- INITIAL POSITION . . . = -98.630 52.630 -68.150

ANCHOR ATTACHMENT - AT NODE NUMBER . . . . = 9010
- POSITION IN FRA . . . . = -52.630 52.630 -329.735
- STOP DIST BELOW ANCHOR. = 100.000

UNSTRETCHED LENGTH OF TETHER . . . . . = 265.406
INITIAL DISTANCE BETWEEN ANCHOR/ATTACHMENT. . = 265.599

LONGITUDAL STIFFNESS OF COMPLETE TETHER . . . = 1.044E+05

WEIGHT OF TETHER = 2.623E+03
BUOYANCY OF TETHER(EXCLUDING END CAP EFFECTS) =-2.618E+03
END CAP BUOYANCY (TETHER ASSUMED VERTICAL) = 0.000E+00
FREE HANGING REACTION (SUM OF ABOVE) = 5.108E+00

INTERNAL FLUID - PRESSURE AT SEA LEVEL . = 0.000E+00
- DENSITY . . . . . = 0.000

IMPACT COEFFICIENTS - AXIAL STRESS FACTOR . . = 3.000E+05
HALF LIFE (SECONDS) . . = 2.500

TETHER GROUP FACTOR(FACTOR FOR VESSEL FORCES = 4

PROGRAM AQWA-NAUT JOB CODE-MINT TITLE-Simple Tether Model - Tubes and Tethers

**** DESCRIPTION OF TENSION LEG TETHER 2****

TETHER NODE	ELEVATION	NODE 1	NODE 2	MATE GROUP	GEOM GROUP	X-SECT AREA	2ND-MOM OF AREA	EI	EA	CAP AREA	EXTERNAL DIAM	AREA.	INLINE/ VERTICAL	X ROT COIL	Y ROT COIL
4	265.4									0.000			1.00E+15	5.73E+03	5.73E+03
		202	201	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
3	176.9														
		203	202	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
2	88.5														
		204	203	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
1	0.0									0.000			1.00E+15	5.73E+03	5.73E+03

TETHER CONFIGURATION- . . . . . = INSTALLED

VESSEL ATTACHMENT - NODE NUMBER . . . . . = 1020
- POSITION IN FRA . . . . = -52.630 -52.630 12.850
- INITIAL POSITION . . . = -98.630 -52.630 -68.150

ANCHOR ATTACHMENT - AT NODE NUMBER . . . . = 9020
- POSITION IN FRA . . . . = -52.630 -52.630 -329.735
- STOP DIST BELOW ANCHOR. = 100.000

UNSTRETCHED LENGTH OF TETHER . . . . . = 265.406
INITIAL DISTANCE BETWEEN ANCHOR/ATTACHMENT. . = 265.599

LONGITUDAL STIFFNESS OF COMPLETE TETHER . . . = 1.044E+05

WEIGHT OF TETHER = 2.623E+03
BUOYANCY OF TETHER(EXCLUDING END CAP EFFECTS) =-2.618E+03
END CAP BUOYANCY (TETHER ASSUMED VERTICAL) = 0.000E+00
FREE HANGING REACTION (SUM OF ABOVE) = 5.108E+00

INTERNAL FLUID - PRESSURE AT SEA LEVEL . = 0.000E+00
- DENSITY . . . . . = 0.000

IMPACT COEFFICIENTS - AXIAL STRESS FACTOR . . = 3.000E+05
HALF LIFE (SECONDS) . . = 2.500

TETHER GROUP FACTOR(FACTOR FOR VESSEL FORCES = 4

PROGRAM AQWA-NAUT JOB CODE-MINT TITLE-Simple Tether Model - Tubes and Tethers

**** DESCRIPTION OF TENSION LEG TETHER 3****

TETHER NODE	ELEVATION	NODE 1	NODE 2	MATE GROUP	GEOM GROUP	X-SECT AREA	2ND-MOM OF AREA	EI	EA	CAP AREA	EXTERNAL DIAM	AREA.	INLINE/ VERTICAL	X ROT COIL	Y ROT COIL
4	265.4									0.000			1.00E+15	5.73E+03	5.73E+03
		302	301	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
3	176.9														
		303	302	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
2	88.5														
		304	303	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
1	0.0									0.000			1.00E+15	5.73E+03	5.73E+03

TETHER CONFIGURATION- . . . . . = INSTALLED

VESSEL ATTACHMENT - NODE NUMBER . . . . . = 1030
- POSITION IN FRA . . . . = 52.630 -52.630 12.850
- INITIAL POSITION . . . = 6.630 -52.630 -68.150

ANCHOR ATTACHMENT - AT NODE NUMBER . . . . = 9030
- POSITION IN FRA . . . . = 52.630 -52.630 -329.735
- STOP DIST BELOW ANCHOR. = 100.000

UNSTRETCHED LENGTH OF TETHER . . . . . = 265.406
INITIAL DISTANCE BETWEEN ANCHOR/ATTACHMENT. . = 265.599

LONGITUDAL STIFFNESS OF COMPLETE TETHER . . . = 1.044E+05

WEIGHT OF TETHER = 2.623E+03
BUOYANCY OF TETHER(EXCLUDING END CAP EFFECTS) =-2.618E+03
END CAP BUOYANCY (TETHER ASSUMED VERTICAL) = 0.000E+00
FREE HANGING REACTION (SUM OF ABOVE) = 5.108E+00

INTERNAL FLUID - PRESSURE AT SEA LEVEL . = 0.000E+00
- DENSITY . . . . . = 0.000

IMPACT COEFFICIENTS - AXIAL STRESS FACTOR . . = 3.000E+05
HALF LIFE (SECONDS) . . = 2.500

TETHER GROUP FACTOR(FACTOR FOR VESSEL FORCES = 4

PROGRAM AQWA-NAUT JOB CODE-MINT TITLE-Simple Tether Model - Tubes and Tethers

**** DESCRIPTION OF TENSION LEG TETHER 4****

TETHER NODE	ELEVATION	NODE 1	NODE 2	MATE GROUP	GEOM GROUP	X-SECT AREA	2ND-MOM OF AREA	EI	EA	CAP AREA	EXTERNAL DIAM	AREA	INLINE/ VERTICAL	X ROT COIL	Y ROT COIL
		ELEMENT DESCRIPTION								EXT AREA			SPRINGS/CONSTRAINTS		
4	265.4									0.000			1.00E+15	5.73E+03	5.73E+03
		402	401	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
3	176.9														
		403	402	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
2	88.5														
		404	403	101	101	0.1289	0.018801	4.042E+06	2.771E+07		0.981				
1	0.0									0.000			1.00E+15	5.73E+03	5.73E+03

TETHER CONFIGURATION- . . . . . = INSTALLED

VESSEL ATTACHMENT - NODE NUMBER . . . . . = 1040
- POSITION IN FRA . . . . = 52.630 52.630 12.850
- INITIAL POSITION . . . = 6.630 52.630 -68.150

ANCHOR ATTACHMENT - AT NODE NUMBER . . . . = 9040
- POSITION IN FRA . . . . = 52.630 52.630 -329.735
- STOP DIST BELOW ANCHOR. = 100.000

UNSTRETCHED LENGTH OF TETHER . . . . . = 265.406
INITIAL DISTANCE BETWEEN ANCHOR/ATTACHMENT. . = 265.599

LONGITUDAL STIFFNESS OF COMPLETE TETHER . . . = 1.044E+05

WEIGHT OF TETHER = 2.623E+03
BUOYANCY OF TETHER(EXCLUDING END CAP EFFECTS) =-2.618E+03
END CAP BUOYANCY (TETHER ASSUMED VERTICAL) = 0.000E+00
FREE HANGING REACTION (SUM OF ABOVE) = 5.108E+00

INTERNAL FLUID - PRESSURE AT SEA LEVEL . = 0.000E+00
- DENSITY . . . . . = 0.000

IMPACT COEFFICIENTS - AXIAL STRESS FACTOR . . = 3.000E+05
HALF LIFE (SECONDS) . . = 2.500

TETHER GROUP FACTOR(FACTOR FOR VESSEL FORCES = 4

* * * * E I G E N S O L U T I O N M O D E 1 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 5

FREQUENCY (RAD/SEC) = 1.2601
FREQUENCY (HERTZ) = 0.2006

PERIOD (SECONDS) = 4.99

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.0000	-0.7746
3	177.06	1.0000	0.0000	0.0000	-0.3931
2	88.53	1.0000	0.0000	0.0000	0.3931
1	0.00	0.0000	0.0000	0.0000	0.7747

* * * * E I G E N S O L U T I O N M O D E 2 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 6

FREQUENCY (RAD/SEC) = 1.2601
FREQUENCY (HERTZ) = 0.2006

PERIOD (SECONDS) = 4.99

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.7746	0.0000
3	177.06	0.0000	1.0000	0.3931	0.0000
2	88.53	0.0000	1.0000	-0.3931	0.0000
1	0.00	0.0000	0.0000	-0.7747	0.0000

* * * * E I G E N S O L U T I O N M O D E 3 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 9

FREQUENCY (RAD/SEC) = 2.6169
FREQUENCY (HERTZ) = 0.4165

PERIOD (SECONDS) = 2.40

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.0000	-1.5922
3	177.06	1.0000	0.0000	0.0000	0.8063
2	88.53	-1.0000	0.0000	0.0000	0.8063
1	0.00	0.0000	0.0000	0.0000	-1.5923

* * * * E I G E N S O L U T I O N M O D E 4 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 10

FREQUENCY (RAD/SEC) = 2.6169
FREQUENCY (HERTZ) = 0.4165

PERIOD (SECONDS) = 2.40

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	1.5922	0.0000
3	177.06	0.0000	1.0000	-0.8063	0.0000
2	88.53	0.0000	-1.0000	-0.8063	0.0000
1	0.00	0.0000	0.0000	1.5923	0.0000

* * * * E I G E N S O L U T I O N M O D E 5 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 7

FREQUENCY (RAD/SEC) = 4.2510
FREQUENCY (HERTZ) = 0.6766

PERIOD (SECONDS) = 1.48

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	9.8680	0.0000
3	177.06	0.0000	0.0133	-9.9996	0.0000
2	88.53	0.0000	0.0134	10.0000	0.0000
1	0.00	0.0000	0.0000	-9.8688	0.0000

```
 * * * * E I G E N   S O L U T I O N   M O D E   6 - T E T H E R   N U M B E R   1 * * * *
       - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                    MODE FREEDOM POSN   =  8

                    FREQUENCY (RAD/SEC) =  4.2510
                    FREQUENCY (HERTZ)   =  0.6766

                    PERIOD    (SECONDS) =    1.48
```

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.0000	9.8680
3	177.06	-0.0133	0.0000	0.0000	-9.9996
2	88.53	-0.0134	0.0000	0.0000	10.0000
1	0.00	0.0000	0.0000	0.0000	-9.8688

* * * * E I G E N S O L U T I O N M O D E 7 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 11

FREQUENCY (RAD/SEC) = 6.2645
FREQUENCY (HERTZ) = 0.9970

PERIOD (SECONDS) = 1.00

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	-4.9402	0.0000
3	177.06	0.0000	1.0000	2.5117	0.0000
2	88.53	0.0000	-1.0000	2.5119	0.0000
1	0.00	0.0000	0.0000	-4.9404	0.0000

* * * * E I G E N S O L U T I O N M O D E 8 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 12

FREQUENCY (RAD/SEC) = 6.2645
FREQUENCY (HERTZ) = 0.9970

PERIOD (SECONDS) = 1.00

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.0000	4.9402
3	177.06	1.0000	0.0000	0.0000	-2.5117
2	88.53	-1.0000	0.0000	0.0000	-2.5119
1	0.00	0.0000	0.0000	0.0000	4.9404

* * * * E I G E N S O L U T I O N M O D E 9 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 15

FREQUENCY (RAD/SEC) = 9.3175
FREQUENCY (HERTZ) = 1.4829

PERIOD (SECONDS) = 0.67

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	10.0000	0.0000
3	177.06	0.0000	-0.9515	4.9826	0.0000
2	88.53	0.0000	-0.9515	-4.9815	0.0000
1	0.00	0.0000	0.0000	-9.9997	0.0000

* * * * E I G E N S O L U T I O N M O D E 10 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 16

FREQUENCY (RAD/SEC) = 9.3175
FREQUENCY (HERTZ) = 1.4829

PERIOD (SECONDS) = 0.67

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.0000	10.0000
3	177.06	0.9515	0.0000	0.0000	4.9826
2	88.53	0.9515	0.0000	0.0000	-4.9815
1	0.00	0.0000	0.0000	0.0000	-9.9997

* * * * E I G E N S O L U T I O N M O D E 11 - T E T H E R N U M B E R 1 * * * *
- -

MODE FREEDOM POSN = 3

FREQUENCY (RAD/SEC) = 11.9184
FREQUENCY (HERTZ) = 1.8969

PERIOD (SECONDS) = 0.53

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	9.9981	0.0000
3	177.06	0.0000	-0.0032	9.9625	0.0000
2	88.53	0.0000	0.0034	9.9634	0.0000
1	0.00	0.0000	0.0000	10.0000	0.0000

```
  * * * * E I G E N   S O L U T I O N   M O D E  12 - T E T H E R  N U M B E R  1 * * * *
        - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                              MODE FREEDOM POSN   =  4

                              FREQUENCY (RAD/SEC) = 11.9184
                              FREQUENCY (HERTZ)   =  1.8969

                              PERIOD    (SECONDS) =    0.53
```

NODE	HEIGHT ABOVE ANCHOR	LATERAL DISPLACEMENT X	LATERAL DISPLACEMENT Y	SLOPE (DEG) RX	SLOPE (DEG) RY
4	265.60	0.0000	0.0000	0.0000	9.9981
3	177.06	0.0032	0.0000	0.0000	9.9625
2	88.53	-0.0034	0.0000	0.0000	9.9634
1	0.00	0.0000	0.0000	0.0000	10.0000

```
 *** COMMENT *** 4 MODES>999.999 RAD/SEC(PERIOD= 0.0063 SECS) NOT PRINTED
```

**** INITIAL POSITION AND VELOCITY OF THE ****
**** CENTRE OF GRAVITY ****

STRUCTURE		TRANSLATIONS(FRA)			ROTATIONS(FRA)			DIRECTION COSINES		
NUMBER	PARAMETER	X	Y	Z	RX	RY	RZ	X	Y	Z
1	POSITION	-46.000	0.000	-17.400	0.000	0.000	0.000	1.0000	0.0000	0.0000
								0.0000	1.0000	0.0000
								0.0000	0.0000	1.0000
	VELOCITY	0.000	0.000	0.000	0.000	0.000	0.000			

* * * * T I M E I N T E G R A T I O N P A R A M E T E R S * * * *
- -

INTEGRATION SCHEME= TWO-STAGE PREDICTOR-CORRECTOR WITH THIRD ORDER ERRORS

STARTING RECORD NUMBER..... 1

NUMBER OF TIME STEPS..... 101

PRESENT TIME STEP..... 0.250

PRESENT TIME..... 0.000

EXPECTED ERRORS FOR INTEGRATION OF SINUSOIDAL MOTION FOR TIME-STEP OF 0.2500

FREQUENCY (RAD/SEC)	PERIOD (SECONDS)	AMPLITUDE ERROR (PER CENT)	PHASE ERROR (DEGREES)
0.0200	314.16	0.0	0.0
0.0300	209.44	0.0	0.0
0.0500	125.66	0.0	0.0
0.0700	89.76	0.0	0.0
0.1000	62.83	0.0	0.0
0.1500	41.89	0.0	0.0
0.2000	31.42	0.0	0.0
0.3000	20.94	0.0	0.1
0.5000	12.57	0.0	0.2
0.7000	8.98	0.0	0.5
1.0000	6.28	0.1	0.9
1.5000	4.19	0.4	2.0
2.0000	3.14	0.9	3.4
5.0000	1.26	10+	10+

* * * * P A R A M E T E R S A F F E C T I N G H Y D R O D Y N A M I C * * * *
* * * * M O R I S O N E L E M E N T F O R C E S * * * *

MULTIPLYING FACTORS FOR HYDRODYNAMIC PARAMETERS

STRUCTURE	DRAG	ADDED MASS	SLAM
1	1.00	1.00	0.00

HYDRODYNAMIC ERROR LIMITS FOR SLAM AND DRAG ON TUBE ELEMENTS

SIGNIFICANT FROUDE NUMBER SQUARED	0.040
VELOCITY PROFILE RATIO	0.100
VELOCITY ALIGNMENT ANGLE	5.730

REYNOLDS NUMBER RELATED PARAMETERS

SCALE FACTOR	1.000
KINEMATIC VISCOSITY	1.570E-06
UNIT REYNOLDS NUMBER	6.369E+05

**** POSITION OF USER-REQUESTED NODES ****

STRUCTURE NUMBER	NODE NUMBER		WITH RESPECT TO THE FIXED REFERENCE AXES X	Y	Z	RELATIVE TO THE CENTRE OF GRAVITY X	Y	Z
1	112	POSITION	6.730	52.730	-68.150	52.730	52.730	-50.750

JOB TITLE-Simple Tether Model - Tubes and Tethers

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
0.00								
1	1	POSITION	-46.0000	0.0000	-17.4000	0.0000	0.0000	0.0000
		VELOCITY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		ACCELERATION	-0.5243	0.0000	-0.5771	0.0000	-0.0535	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	3.0121E+06	1.0000E+00	-1.1243E+07	0.0000E+00
		MORISON DRAG	3.9472E+04	3.2427E-05	-2.6299E+03	3.9738E-03	3.4975E+05	9.1185E-04
		FROUDE KRYLOV	-1.9891E+05	-2.3355E-04	-1.8876E+05	-2.3931E-02	1.2567E+07	4.7408E-02
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	6.1483E+04	0.0000E+00	-3.4963E+05	0.0000E+00	-3.1243E+06	0.0000E+00
		TOTAL FORCE	-2.9169E+05	-5.4677E-04	-1.8145E+05	9.5026E-01	2.1048E+06	-2.5250E-02
		ERROR PER TIMESTEP	1.3654E-03	2.0646E-11	1.5027E-03	-1.8400E-12	2.4305E-06	3.0456E-13
		POSITION NODE 112	6.7300	52.7300	-68.1500			
2.50								
11	1	POSITION	-48.3081	0.0000	-17.8417	0.0000	-0.0043	0.0000
		VELOCITY	-1.9594	0.0000	-0.2762	0.0000	0.0097	0.0000
		ACCELERATION	-0.7709	0.0000	-0.5644	0.0000	-0.0585	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	2.6687E+06	-1.5580E+00	-9.8036E+06	0.0000E+00
		MORISON DRAG	2.1837E+04	5.9670E-03	-2.8342E+03	1.1721E+00	4.8646E+05	-7.4257E+00
		FROUDE KRYLOV	-2.4772E+05	-1.5207E-05	1.0339E+05	-2.3863E-01	1.1548E+07	-4.6332E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	6.3551E+04	7.4370E-03	-3.2093E+05	0.0000E+00	-2.6885E+06	1.0625E+00
		TOTAL FORCE	-4.0343E+05	6.1413E-03	-1.7750E+05	-8.8584E-01	4.1436E+06	-1.5750E+02
		ERROR PER TIMESTEP	-2.5247E-05	7.4193E-11	-1.8943E-04	1.2594E-11	-5.9020E-07	-7.0781E-11
		POSITION NODE 112	4.4257	52.7300	-68.5878			

```
JOB TITLE-Simple Tether Model - Tubes and Tethers
```

TIME(SECS) / RECORD NO.	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT / CENTRE OF GRAVITY	DEGREE OF FREEDOM X SURGE	Y SWAY	Z HEAVE	RX ROLL	RY PITCH	RZ YAW
5.00								
21	1	POSITION	-55.0088	0.0000	-19.2384	0.0000	0.0157	0.0000
		VELOCITY	-3.0835	0.0000	-0.5104	0.0000	-0.0106	0.0000
		ACCELERATION	0.0191	0.0000	-0.2321	0.0000	-0.1473	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	2.4969E+06	1.7745E+00	-4.4670E+05	0.0000E+00
		MORISON DRAG	7.5630E+03	6.3290E-03	1.1770E+03	-2.7106E+00	-2.9997E+05	2.2284E-01
		FROUDE KRYLOV	-1.5043E+04	-7.5831E-05	2.6192E+05	3.0107E-01	6.9525E+05	1.6795E+01
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	5.1201E+04	5.0732E-03	-2.2375E+05	5.0000E-01	-3.8875E+06	1.2500E-01
		TOTAL FORCE	2.9045E+04	1.1251E-02	-7.2998E+04	1.0120E-01	-3.6098E+06	4.8086E+02
		ERROR PER TIMESTEP	-1.7444E-05	5.2960E-11	-2.5437E-05	4.4616E-12	-9.0932E-07	-9.1095E-10
		POSITION NODE 112	-2.2927	52.7300	-70.0029			

```
*** ANALYSIS WARNING *** TETHER NUMBER  1 ON STRUCTURE  1 AT TIME=    6.5 SECONDS
                         HAS BECOME SLACK

*** ANALYSIS WARNING *** TETHER NUMBER  2 ON STRUCTURE  1 AT TIME=    6.5 SECONDS
                         HAS BECOME SLACK
```

**** TIME HISTORY OF SINGLE TETHER NUMBER 1 ****

STEP NUMB	TIME (SECONDS)	NODE	HEIGHT ABOVE ANCHOR	POSITIONS X	POSITIONS Y	POSITIONS RX	POSITIONS RY	VELOCITIES X	VELOCITIES Y	VELOCITIES RX	VELOCITIES RY	ACCELERATIONS X	ACCELERATIONS Y	ACCELERATIONS RX	ACCELERATIONS RY
27	6.50	4	265.4	0.000	0.000	0.00	-0.66	0.000	0.000	0.00	-0.13	0.000	0.000	0.000	-0.208
		3	176.9	0.765	0.000	0.00	-0.05	-0.079	0.000	0.00	0.41	0.536	0.000	0.000	-0.094
		2	88.5	0.651	0.000	0.00	0.14	-0.227	0.000	0.00	-0.14	0.155	0.000	0.000	0.370
		1	0.0	0.000	0.000	0.00	0.93	0.000	0.000	0.00	0.11	0.000	0.000	0.000	0.079

* * * * T I M E H I S T O R Y O F S I N G L E T E T H E R N U M B E R 2 * * * *

STEP NUMB	TIME (SECONDS)	NODE	HEIGHT ABOVE ANCHOR	POSITIONS X	POSITIONS Y	POSITIONS RX	POSITIONS RY	VELOCITIES X	VELOCITIES Y	VELOCITIES RX	VELOCITIES RY	ACCELERATIONS X	ACCELERATIONS Y	ACCELERATIONS RX	ACCELERATIONS RY
27	6.50	4	265.4	0.000	0.000	0.00	-0.66	0.000	0.000	0.00	-0.13	0.000	0.000	0.000	-0.208
		3	176.9	0.765	0.000	0.00	-0.05	-0.079	0.000	0.00	0.41	0.536	0.000	0.000	-0.094
		2	88.5	0.651	0.000	0.00	0.14	-0.227	0.000	0.00	-0.14	0.155	0.000	0.000	0.370
		1	0.0	0.000	0.000	0.00	0.93	0.000	0.000	0.00	0.11	0.000	0.000	0.000	0.079

* * * * T I M E H I S T O R Y O F S I N G L E T E T H E R N U M B E R 3 * * * *

STEP NUMB	TIME (SECONDS)	NODE	HEIGHT ABOVE ANCHOR	POSITIONS X	POSITIONS Y	POSITIONS RX	POSITIONS RY	VELOCITIES X	VELOCITIES Y	VELOCITIES RX	VELOCITIES RY	ACCELERATIONS X	ACCELERATIONS Y	ACCELERATIONS RX	ACCELERATIONS RY
27	6.50	4	265.5	0.000	0.000	0.00	0.07	0.000	0.000	0.00	0.50	0.000	0.000	0.000	-0.091
		3	177.0	0.255	0.000	0.00	-0.19	-0.621	0.000	0.00	0.26	0.324	0.000	0.000	-0.156
		2	88.5	0.431	0.000	0.00	0.07	-0.630	0.000	0.00	-0.08	-0.440	0.000	0.000	0.447
		1	0.0	0.000	0.000	0.00	0.60	0.000	0.000	0.00	-0.62	0.000	0.000	0.000	-0.993

*** * * * T I M E H I S T O R Y O F S I N G L E T E T H E R N U M B E R 4 * * * ***

STEP NUMB	TIME (SECONDS)	NODE	HEIGHT ABOVE ANCHOR	POSITIONS X	POSITIONS Y	POSITIONS RX	POSITIONS RY	VELOCITIES X	VELOCITIES Y	VELOCITIES RX	VELOCITIES RY	ACCELERATIONS X	ACCELERATIONS Y	ACCELERATIONS RX	ACCELERATIONS RY
27	6.50	4	265.5	0.000	0.000	0.00	0.07	0.000	0.000	0.00	0.50	0.000	0.000	0.000	-0.091
		3	177.0	0.255	0.000	0.00	-0.19	-0.621	0.000	0.00	0.26	0.324	0.000	0.000	-0.156
		2	88.5	0.431	0.000	0.00	0.07	-0.630	0.000	0.00	-0.08	-0.440	0.000	0.000	0.447
		1	0.0	0.000	0.000	0.00	0.60	0.000	0.000	0.00	-0.62	0.000	0.000	0.000	-0.993

* * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 1 * * * *

NODE NUMB	ELEVATION	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE X	SHEAR FORCE Y	BENDING MOMENTS X	BENDING MOMENTS Y	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES BENDING+AXIAL MIN	STRESSES MAXIMUM VON MISES	STRESSES BENDING Y
4	265.4	4.976E+00										
			-6.978E+02	1.221E+02	1.946E-04	-2.907E-04	-1.356E+03	2.03E+03	3.49E+04	-4.57E+04	4.12E+04	-4.03E+04
			-1.550E+03	2.043E+01	-9.764E-06	-3.072E-03	-5.343E+02	3.39E+02	3.86E+03	-2.79E+04	2.56E+04	1.59E+04
3	176.9	3.317E+00										
			-1.550E+03	-2.043E+01	9.764E-06	3.072E-03	5.343E+02	3.39E+02	3.86E+03	-2.79E+04	2.56E+04	1.59E+04
			-2.401E+03	-6.291E+00	-9.915E-05	1.698E-03	-1.277E+02	1.04E+02	-1.48E+04	-2.24E+04	3.25E+04	3.79E+03
2	88.5	1.658E+00										
			-2.401E+03	6.291E+00	9.915E-05	-1.698E-03	1.277E+02	1.04E+02	-1.48E+04	-2.24E+04	3.25E+04	3.79E+03
			-3.253E+03	-1.128E+01	1.230E-04	-1.004E-04	-1.204E+03	1.87E+02	1.06E+04	-6.10E+04	5.50E+04	3.58E+04
1	0.0	-7.324E-04										

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 2 * * * ***

NODE NUMB	ELEV-ATION	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE X	SHEAR FORCE Y	BENDING MOMENTS X	BENDING MOMENTS Y	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES BENDING+AXIAL MIN	STRESSES MAXIMUM VON MISES	STRESSES BENDING Y
4	265.4	4.976E+00										
			-6.978E+02	1.221E+02	1.946E-04	-2.907E-04	-1.356E+03	2.03E+03	3.49E+04	-4.57E+04	4.12E+04	-4.03E+04
			-1.550E+03	2.043E+01	-9.759E-06	-3.072E-03	-5.343E+02	3.39E+02	3.86E+03	-2.79E+04	2.56E+04	1.59E+04
3	176.9	3.317E+00										
			-1.550E+03	-2.043E+01	9.759E-06	3.072E-03	5.343E+02	3.39E+02	3.86E+03	-2.79E+04	2.56E+04	1.59E+04
			-2.401E+03	-6.290E+00	-9.916E-05	1.698E-03	-1.276E+02	1.04E+02	-1.48E+04	-2.24E+04	3.25E+04	3.79E+03
2	88.5	1.658E+00										
			-2.401E+03	6.290E+00	9.916E-05	-1.698E-03	1.276E+02	1.04E+02	-1.48E+04	-2.24E+04	3.25E+04	3.79E+03
			-3.253E+03	-1.128E+01	1.230E-04	-1.004E-04	-1.204E+03	1.87E+02	1.06E+04	-6.10E+04	5.50E+04	3.58E+04
1	0.0	-7.324E-04										

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 3 * * * ***

NODE NUMB	ELEV-ATION	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE X	SHEAR FORCE Y	BENDING MOMENTS X	BENDING MOMENTS Y	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES MIN	STRESSES MAXIMUM VON MISES	STRESSES BENDING Y
4	265.5	1.148E+04										
			1.078E+04	2.394E+01	-1.160E-04	-6.283E-04	-1.274E+03	3.98E+02	1.22E+05	4.58E+04	1.27E+05	-3.79E+04
			9.932E+03	-3.886E+01	-9.341E-05	-3.089E-03	3.376E+01	6.45E+02	7.81E+04	7.61E+04	9.24E+04	-1.00E+03
3	177.0	1.148E+04										
			9.932E+03	3.886E+01	9.341E-05	3.089E-03	-3.376E+01	6.45E+02	7.81E+04	7.61E+04	9.24E+04	-1.00E+03
			9.080E+03	8.916E+00	-5.466E-04	2.184E-03	-3.476E+02	1.48E+02	8.08E+04	6.01E+04	1.04E+05	1.03E+04
2	88.5	1.148E+04										
			9.080E+03	-8.916E+00	5.466E-04	-2.184E-03	3.476E+02	1.48E+02	8.08E+04	6.01E+04	1.04E+05	1.03E+04
			8.228E+03	4.857E+01	7.168E-04	-4.352E-04	-1.246E+03	8.07E+02	1.01E+05	2.68E+04	1.32E+05	3.70E+04
1	0.0	1.148E+04										

*** * * * T I M E H I S T O R Y O F F O R C E S A N D S T R E S S E S F O R T E T H E R N U M B E R 4 * * * ***

NODE NUMB	ELEV-ATION	TENSIONS EFFECTIVE	TENSIONS WALL	SHEAR FORCE X	SHEAR FORCE Y	BENDING MOMENTS X	BENDING MOMENTS Y	STRESSES SHEAR	STRESSES BENDING+AXIAL MAX	STRESSES BENDING+AXIAL MIN	STRESSES MAXIMUM VON MISES	STRESSES BENDING Y
4	265.5	1.149E+04										
			1.079E+04	2.394E+01	-1.160E-04	-6.283E-04	-1.274E+03	3.98E+02	1.22E+05	4.58E+04	1.27E+05	-3.79E+04
			9.935E+03	-3.887E+01	-9.343E-05	-3.088E-03	3.373E+01	6.46E+02	7.81E+04	7.61E+04	9.24E+04	-1.00E+03
3	177.0	1.149E+04										
			9.935E+03	3.887E+01	9.343E-05	3.088E-03	-3.373E+01	6.46E+02	7.81E+04	7.61E+04	9.24E+04	-1.00E+03
			9.083E+03	8.919E+00	-5.466E-04	2.184E-03	-3.476E+02	1.48E+02	8.08E+04	6.01E+04	1.04E+05	1.03E+04
2	88.5	1.148E+04										
			9.083E+03	-8.919E+00	5.466E-04	-2.184E-03	3.476E+02	1.48E+02	8.08E+04	6.01E+04	1.04E+05	1.03E+04
			8.231E+03	4.857E+01	7.169E-04	-4.352E-04	-1.246E+03	8.07E+02	1.01E+05	2.68E+04	1.32E+05	3.70E+04
1	0.0	1.148E+04										

*** ANALYSIS WARNING *** TETHER NUMBER 1 ON STRUCTURE 1 AT TIME= 7.5 SECONDS
HAS IMPACTED ON THE UPPER ANCHOR CONSTRAINT

*** ANALYSIS WARNING *** TETHER NUMBER 2 ON STRUCTURE 1 AT TIME= 7.5 SECONDS
HAS IMPACTED ON THE UPPER ANCHOR CONSTRAINT

JOB TITLE-Simple Tether Model - Tubes and Tethers

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
7.50								
31	1	POSITION	-61.5128	0.0000	-20.7326	0.0000	-0.0525	0.0000
		VELOCITY	-1.7340	0.0000	-0.2776	0.0000	0.1034	0.0000
		ACCELERATION	0.9602	0.0000	0.3120	0.0000	0.1061	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	2.7175E+06	-6.5496E+00	8.7313E+06	0.0000E+00
		MORISON DRAG	1.3297E+04	9.4387E-03	4.3830E+03	2.1480E+00	-9.3373E+05	4.2294E+00
		FROUDE KRYLOV	2.3201E+05	6.0608E-04	1.3639E+05	-1.3075E+00	-1.0345E+07	-1.3914E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	3.1796E+04	8.1134E-03	-1.3662E+05	0.0000E+00	2.2165E+06	-1.7500E+00
		TOTAL FORCE	5.0325E+05	1.5717E-02	9.8282E+04	-5.4838E+00	-4.3254E+06	-4.0017E+01
		ERROR PER TIMESTEP	2.5774E-05	-1.6904E-08	3.2173E-04	1.2911E-09	3.4209E-06	5.2036E-10
		POSITION NODE 112	-8.7363	52.7300	-71.4342			

IMPACT VELOCITY= 0.25 CAUSING AN INITIAL AXIAL STRESS= 7.557E+04

IMPACT VELOCITY= 0.25 CAUSING AN INITIAL AXIAL STRESS= 7.558E+04

10.00								
41	1	POSITION	-62.5992	0.0000	-21.0239	0.0000	-0.0090	0.0000
		VELOCITY	0.8174	0.0000	0.3214	0.0000	-0.0246	0.0000
		ACCELERATION	0.8847	0.0000	0.4660	0.0000	0.0634	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	3.0792E+06	9.7571E+00	1.2211E+07	0.0000E+00
		MORISON DRAG	2.1062E+04	2.1173E-02	1.7980E+03	-3.0795E+00	4.8111E+05	8.9155E+01
		FROUDE KRYLOV	2.2925E+05	3.1615E-04	-1.5706E+05	2.6210E-01	-1.2995E+07	3.1438E+01
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	2.7436E+04	-2.7199E-02	-1.2868E+05	-6.5863E+02	-4.0349E+05	-1.3844E+02
		TOTAL FORCE	5.0151E+05	-1.4583E-02	1.4655E+05	-6.5182E+02	-4.0063E+06	1.0875E+02
		ERROR PER TIMESTEP	1.0404E-05	-6.4142E-10	2.9906E-04	7.6475E-12	1.6203E-06	-4.4436E-10
		POSITION NODE 112	-9.8612	52.7300	-71.7656			

JOB TITLE-Simple Tether Model - Tubes and Tethers

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
12.50								
51	1	POSITION	-58.4922	0.0000	-19.9855	0.0000	-0.0564	0.0000
		VELOCITY	2.1277	0.0000	0.5358	0.0000	0.0407	0.0000
		ACCELERATION	0.1036	0.0000	0.2108	0.0000	0.1086	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	3.2109E+06	3.3301E+00	-1.9020E+03	0.0000E+00
		MORISON DRAG	3.8038E+03	6.2321E-03	-1.6279E+03	-3.3782E+00	1.6669E+05	2.0374E+00
		FROUDE KRYLOV	2.9055E+02	-2.2321E-03	-2.7374E+05	-2.2231E-01	-1.8598E+04	-1.1363E+01
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	4.5466E+04	-2.5065E-02	-2.0927E+05	6.5750E+02	1.8610E+06	1.3413E+02
		TOTAL FORCE	4.9598E+04	3.0495E-02	6.6310E+04	6.5788E+02	1.9918E+06	7.2605E+01
		ERROR PER TIMESTEP	-1.3956E-05	-3.6830E-08	2.3360E-04	3.6370E-09	1.4980E-06	7.3051E-10
		POSITION NODE 112	-5.7123	52.7300	-70.6836			
15.00								
61	1	POSITION	-53.6679	0.0000	-18.9671	0.0000	-0.0348	0.0000
		VELOCITY	1.3897	0.0000	0.2977	0.0000	-0.0436	0.0000
		ACCELERATION	-0.6920	0.0000	0.1058	0.0000	0.0544	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	3.0207E+06	-3.3485E+00	-1.2150E+07	0.0000E+00
		MORISON DRAG	1.0391E+04	1.4165E-03	-4.1470E+03	8.1001E-01	2.0253E+05	4.2915E+00
		FROUDE KRYLOV	-2.2547E+05	-7.0857E-04	-1.5945E+05	-5.6896E-03	1.3187E+07	6.6994E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	3.5413E+04	-1.2859E-02	-1.7441E+05	-1.5000E+00	8.9230E+05	7.7500E+00
		TOTAL FORCE	-3.9958E+05	-7.7901E-03	3.3165E+04	-4.3147E+00	5.7385E+06	1.0616E+02
		ERROR PER TIMESTEP	-2.9136E-05	1.4221E-10	1.8837E-04	8.4640E-12	5.9197E-07	-1.0528E-10
		POSITION NODE 112	-0.9071	52.7300	-69.6851			

JOB TITLE-Simple Tether Model - Tubes and Tethers

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
17.50								
71	1	POSITION	-52.7015	0.0000	-18.7856	0.0000	-0.0202	0.0000
		VELOCITY	-0.6690	0.0000	-0.2053	0.0000	0.0313	0.0000
		ACCELERATION	-0.8157	0.0000	0.0354	0.0000	0.0244	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	2.6732E+06	-8.0298E-01	-9.1819E+06	0.0000E+00
		MORISON DRAG	-9.5283E+02	4.3539E-03	-2.5536E+03	8.1288E-01	4.0161E+05	2.1883E+00
		FROUDE KRYLOV	-2.3831E+05	-1.6237E-04	1.2320E+05	2.2335E-01	1.0924E+07	5.1261E-01
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	3.3216E+04	2.0773E-02	-1.5855E+05	2.0000E+00	-8.5785E+04	-2.7813E+00
		TOTAL FORCE	-4.3802E+05	3.1024E-02	1.1056E+04	2.4821E+00	6.4265E+06	8.5748E-02
		ERROR PER TIMESTEP	-3.5704E-05	-1.6540E-08	9.6286E-05	1.2807E-09	3.6460E-07	-5.0127E-11
		POSITION NODE 112	0.0465	52.7300	-69.5170			
20.00								
81	1	POSITION	-56.1947	0.0000	-19.5371	0.0000	-0.0304	0.0000
		VELOCITY	-1.7574	0.0000	-0.4493	0.0000	-0.0300	0.0000
		ACCELERATION	0.0286	0.0000	0.1197	0.0000	0.0678	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	2.5056E+06	3.1596E+00	-3.1400E+05	0.0000E+00
		MORISON DRAG	-1.1501E+03	-3.6969E-03	1.0017E+03	-9.7694E-01	1.0261E+05	1.5592E+00
		FROUDE KRYLOV	-1.0063E+04	-3.2819E-03	2.6249E+05	1.1900E+00	4.6084E+05	2.9807E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	2.6826E+04	4.0681E-03	-1.2216E+05	-6.5500E+02	9.1322E+05	-1.4506E+02
		TOTAL FORCE	5.9570E+03	6.5517E-02	3.7625E+04	-6.4983E+02	1.3812E+06	-5.6231E+01
		ERROR PER TIMESTEP	1.8234E-06	-5.6348E-08	1.7923E-05	3.8878E-09	4.6335E-07	1.2070E-09
		POSITION NODE 112	-3.4378	52.7300	-70.2591			

JOB TITLE-Simple Tether Model - Tubes and Tethers

TIME(SECS)	STRUCTURE NUMBER	POSITION,FORCES AND MOMENTS AT	DEGREE OF FREEDOM X	Y	Z	RX	RY	RZ
RECORD NO.		CENTRE OF GRAVITY	SURGE	SWAY	HEAVE	ROLL	PITCH	YAW
22.50								
91	1	POSITION	-59.4986	0.0000	-20.2628	0.0000	-0.0228	0.0000
		VELOCITY	-0.5126	0.0000	-0.1947	0.0000	-0.0082	0.0000
		ACCELERATION	0.8933	0.0000	0.2327	0.0000	0.0438	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	2.6925E+06	1.7225E+00	8.4401E+06	0.0000E+00
		MORISON DRAG	-5.5004E+03	-3.4960E-02	3.7418E+03	-5.2025E+00	-1.2795E+04	2.9870E+01
		FROUDE KRYLOV	2.2637E+05	-3.0249E-05	1.4438E+05	9.6455E-01	-1.0146E+07	-3.6181E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	3.1242E+04	-3.6560E-02	-1.4491E+05	6.5225E+02	3.7849E+05	1.5341E+02
		TOTAL FORCE	4.7266E+05	-6.9366E-02	7.3240E+04	6.4993E+02	-5.3599E+06	7.9769E+01
		ERROR PER TIMESTEP	2.6524E-05	3.4181E-08	-4.5370E-05	-2.5613E-09	-1.1609E-07	-5.2364E-10
		POSITION NODE 112	-6.7484	52.7300	-70.9919			
25.00								
101	1	POSITION	-57.7193	0.0000	-19.8629	0.0000	0.0265	0.0000
		VELOCITY	1.9350	0.0000	0.3823	0.0000	-0.0460	0.0000
		ACCELERATION	0.8865	0.0000	0.1859	0.0000	-0.0604	0.0000
		GRAVITY	0.0000E+00	0.0000E+00	-2.6369E+06	0.0000E+00	0.0000E+00	0.0000E+00
		HYDROSTATIC	0.0000E+00	0.0000E+00	3.0166E+06	6.4041E+00	1.2582E+07	0.0000E+00
		MORISON DRAG	-3.8108E+03	8.6370E-03	2.0934E+03	4.6073E+00	9.0086E+05	8.1696E+00
		FROUDE KRYLOV	2.4225E+05	-2.6037E-04	-1.3463E+05	-1.6426E+00	-1.3422E+07	-1.2431E+00
		CURRENT DRAG	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
		MOORING	3.5663E+04	2.8860E-02	-1.7856E+05	6.5938E+02	-3.5662E+06	1.2225E+02
		TOTAL FORCE	5.1050E+05	2.9839E-02	5.8338E+04	6.6899E+02	-7.1287E+06	1.2855E+02
		ERROR PER TIMESTEP	2.4851E-05	-4.1309E-08	-8.2886E-05	3.7279E-09	-8.8664E-07	6.3908E-10
		POSITION NODE 112	-5.0127	52.7300	-70.6373			

* * * * H A R M O N I C A N A L Y S I S O F S T R U C T U R E R E S P O N S E * * * *

STRUCTURE NUMBER = 1
WAVE AMPLITUDE = 15.000
WAVE FREQUENCY(RAD/SEC) = 0.419
WAVE PERIOD(SECONDS) = 15.000
WAVE DIRECTION = 0.000

WAVE CYCLE NUMB	CYCLE START TIME	FREEDOM	MEAN	FUNDAMENTAL AMP	FUNDAMENTAL PHASE	2ND HARMONIC AMP	2ND HARMONIC PHASE	3RD HARMONIC AMP	3RD HARMONIC PHASE	4TH HARMONIC AMP	4TH HARMONIC PHASE	DRIFT /CYCLE
POSITION OF COG												
1	0.00	in X direction	-56.0000	6.3223	27.5	0.1800	3.8	0.1323	1.0	0.0798	0.5	-7.6679
1	0.00	in Y direction	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000
1	0.00	in Z direction	-19.5151	1.3677	27.0	0.0717	-73.1	0.0239	-49.4	0.0264	-48.4	-1.5671
1	0.00	about X axis	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000
1	0.00	about Y axis	-0.0180	0.0099	-70.2	0.0115	99.9	0.0353	-61.0	0.0122	147.9	-0.0348
1	0.00	about Z axis	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000

* * * * H A R M O N I C A N A L Y S I S O F S T R U C T U R E R E S P O N S E * * * *

STRUCTURE NUMBER = 1
WAVE AMPLITUDE = 15.000
WAVE FREQUENCY(RAD/SEC) = 0.419
WAVE PERIOD(SECONDS) = 15.000
WAVE DIRECTION = 0.000

WAVE CYCLE NUMB	CYCLE START TIME	FREEDOM	MEAN	FUNDAMENTAL AMP	FUNDAMENTAL PHASE	2ND HARMONIC AMP	2ND HARMONIC PHASE	3RD HARMONIC AMP	3RD HARMONIC PHASE	4TH HARMONIC AMP	4TH HARMONIC PHASE	DRIFT /CYCLE
VELOCITY OF COG												
1	0.00	in X direction	-0.5120	2.2594	-57.3	0.0828	84.3	0.0010	-38.8	0.0027	113.4	1.3897
1	0.00	in Y direction	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000
1	0.00	in Z direction	-0.1006	0.4927	-57.2	0.0586	146.8	0.0226	131.5	0.0225	-176.1	0.2977
1	0.00	about X axis	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000
1	0.00	about Y axis	-0.0015	0.0157	-101.8	0.0129	-28.6	0.0461	-145.5	0.0173	41.4	-0.0436
1	0.00	about Z axis	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000

* * * * H A R M O N I C A N A L Y S I S O F S T R U C T U R E R E S P O N S E * * * *

STRUCTURE NUMBER = 1
WAVE AMPLITUDE = 15.000
WAVE FREQUENCY(RAD/SEC) = 0.419
WAVE PERIOD(SECONDS) = 15.000
WAVE DIRECTION = 0.000

WAVE CYCLE NUMB	CYCLE START TIME	FREEDOM	MEAN	FUNDAMENTAL AMP	FUNDAMENTAL PHASE	2ND HARMONIC AMP	2ND HARMONIC PHASE	3RD HARMONIC AMP	3RD HARMONIC PHASE	4TH HARMONIC AMP	4TH HARMONIC PHASE	DRIFT /CYCLE
ACCELERATION OF COG												
1	0.00	in X direction	0.0930	0.9770	-144.6	0.0785	-26.6	0.0217	-90.3	0.0162	-68.4	-0.1677
1	0.00	in Y direction	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000
1	0.00	in Z direction	0.0190	0.2053	148.4	0.1643	80.4	0.1023	81.4	0.1162	88.5	0.6829
1	0.00	about X axis	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000
1	0.00	about Y axis	-0.0024	0.0353	98.7	0.0120	99.8	0.0683	121.4	0.0291	-13.6	0.1078
1	0.00	about Z axis	0.0000	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000	0.0	0.0000

APPENDIX A - DETAILED CARD IMAGE DESCRIPTION OF DECK 14

This section describes in detail the additional input data requirements for the input of tether elements for AQWA-DRIFT and AQWA-NAUT for Deck 14.

For a full description of Deck 14 see the AQWA Reference Manual Sections 4.14 and 4.18.

A summary of the card input, indicating the parameters required, is shown below. An * indicates that data is required.

CARD	Description	Integers(I5)				Reals(E10.0)			
	Start Column	11	16	21	26	31	41	51	61
AQWA-DRIFT/NAUT									
TELM	Element definition	*	*	*	*				
TSPA	Tether anchor springs					*	*	*	
TSPV	Tether vessel springs					*	*	*	
TEIG	Eigenvalue calc request	*							
AQWA-DRIFT Only									
TFAT	Tether fatigue params					*	*	*	*
TPSH	Tether peak stress hours					*			
Installed Tethers Only									
TSLK	Print when slack params					*			
TEGR	Tether group factor	*							
TCAP	Tether end caps					*	*		
TIFL	Internal fluid press/dens					*	*		
TIMP	Tether impact fac & ½ life					*	*		
TLOW	Lower stop dist below anch					*			
AQWA-DRIFT/NAUT									
TETH	Vessel/anchor nodes	*	*	*	*				
Not Yet Available									
TSTE	Pre-Processing tether steady state required								
TTIM	Pre-Processing tether time history required								
TRAO	Pre-Processing tether R.A.O.s required								

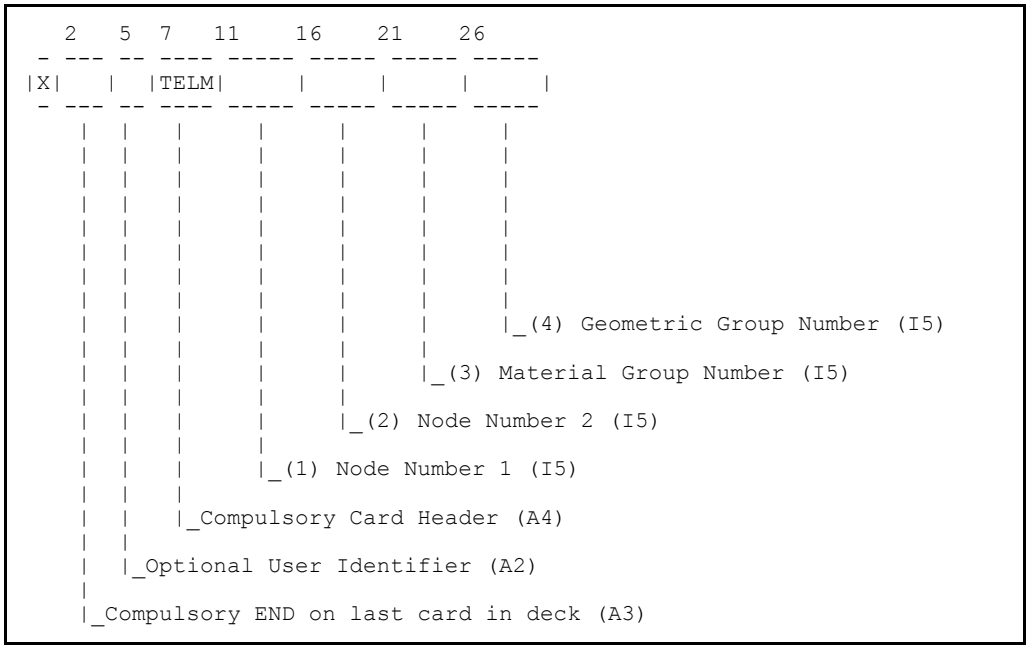
A.1 The TELM Card - Tether Element

The maximum number of tether elements for all tethers is 180

The maximum number of tether element for a single tether is 24

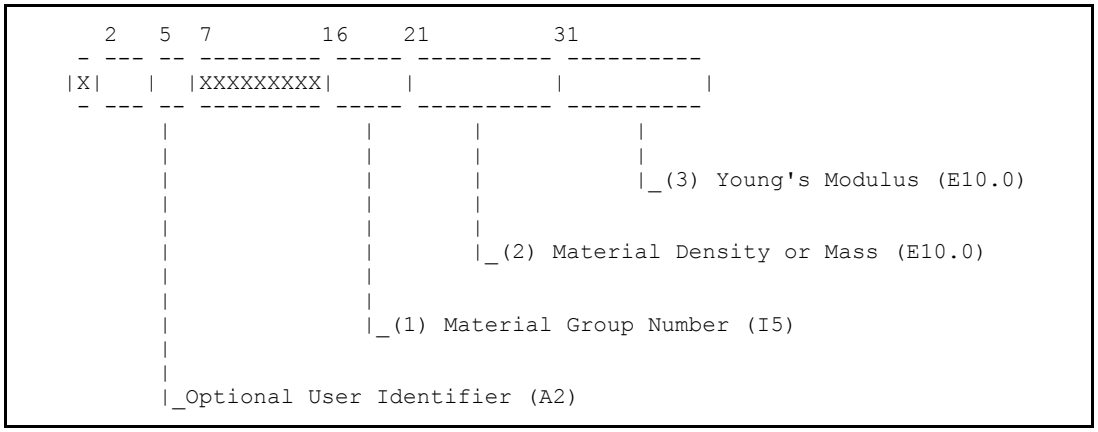
If an eigenvalue analysis is requested, the maximum number of tether elements per tether is reduced to 14

Tether elements must be contiguous, i.e. on all but the first TELM Card the first node input must be the same as the second node of the previous TELM Card.



(1)-(2) These are the nodes input in Deck 1 and define the length of the tether element only. The first element is considered to have Node 1 attached to the anchor, for installed tethers. It is the trailing node for towed tethers.

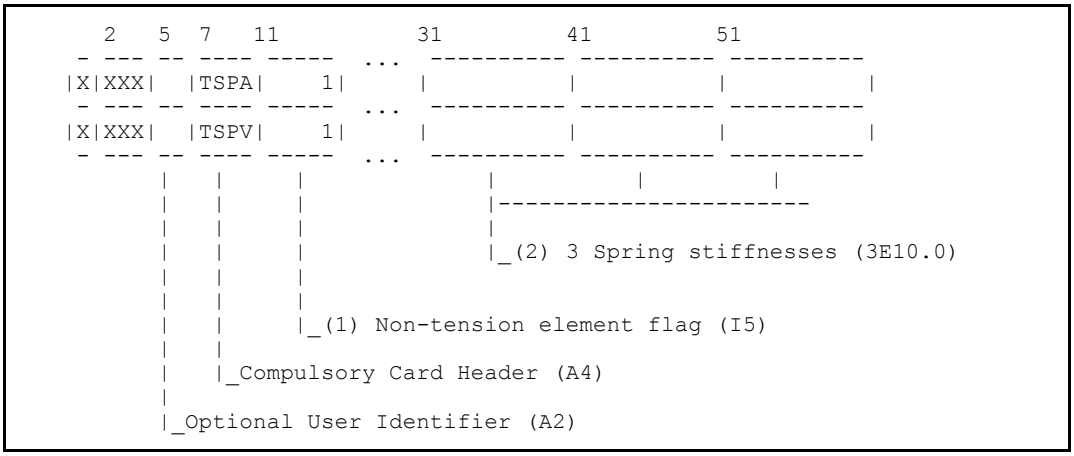
(3) The material group number (input in Deck 3) for this element. There are two parameters input for the material properties of tether elements. These are density and Young's Modulus of elasticity, i.e.



(4) The Geometric Group for this element. Geometric properties for tether elements are the same as for TUBE elements, except that tether elements cannot be free flooding or have end cuts, i.e. they have diameter, wall thickness, drag and added mass coefficients specified.

A.2 The TSPA/TSPV Cards - Tether Anchor and Vessel Springs

Only one TSPA and one TSPV card may be input for each tether.



(1) For installed tethers, this should be left blank. For towed tethers, a '1' should be entered in Column 15.

(2) The values of the stiffnesses of the springs at the anchor end should be specified on the TSPA card. The stiffnesses of the springs at the vessel end should be specified on the TSPV card.

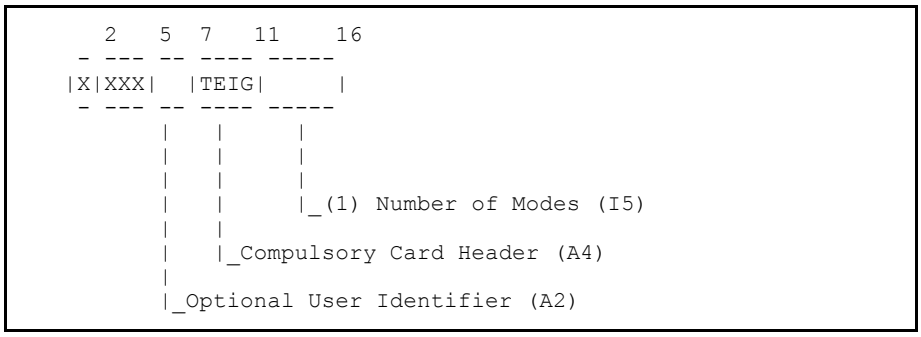
For installed tethers, the spring stiffnesses are the inline/vertical stiffness and the two rotational stiffnesses at the ends of the tether. Default values of 1.0E15 are used, if this card is omitted. A default value of 1.0E15 for the inline stiffness is used if the 1st field is left blank or a negative or zero values is input. For the rotational fields, any value may be entered (except negative values which will be set to zero).

For towed tethers, the stiffnesses are assumed to represent soft mooring line stiffness and are the three stiffnesses in the translational directions. Note that the higher the stiffnesses input here, the smaller the time steps will need to be in Deck 16. This card should always be present for towed tethers.

A.3 The TEIG Card - Tether Eigensolution

This card should be input for all preliminary runs.

The TEIG card request that an eigenvalue analysis of the tether at zero displacement from the TLA axis system should be performed.

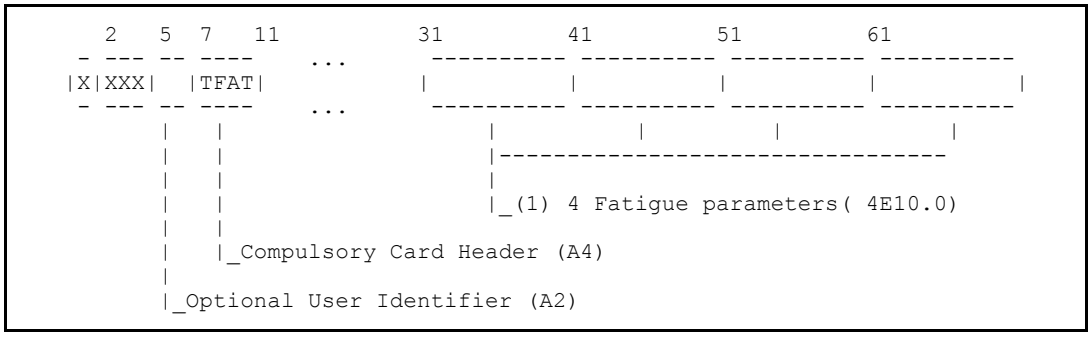


(1) The number of modes to be output for the pre-processing eigensolution. The total number of modes available is:

Number of modes	=	total number of degrees of freedom
	=	number of nodes * number of degrees of freedom/node
	=	number of nodes * 4

A.4 The TFAT Card - Tether Fatigue Parameters (AQWA-DRIFT only)

This card may be omitted, in which case the default values shown below will be used.



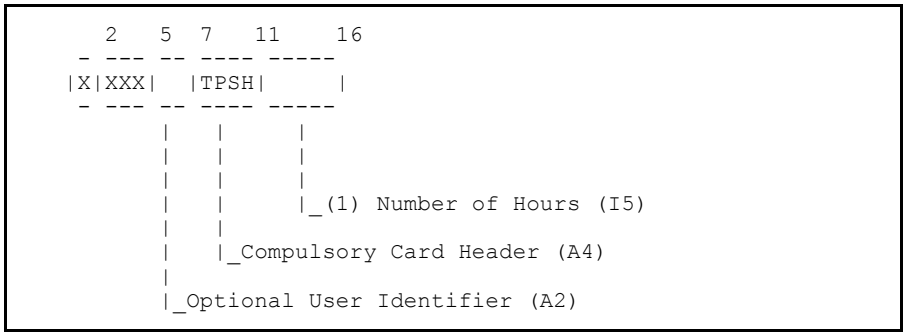
(1) The four fatigue parameters are:

1. Reserved (leave blank)
2. Stress concentration factor (default value 1.24)
3. SN Curve intercept coefficient (default value 1.3367E24)
   N.B. Units are consistent with stress in kN/m²
4. SN Curve slope m (default value 3.5)

See Section 3.7 for exact details of usage.

A.5 The TPSH Card - Tether Peak Stress Hours (AQWA-DRIFT only)

This card may be omitted, in which case the default value of 3 hours will be used.

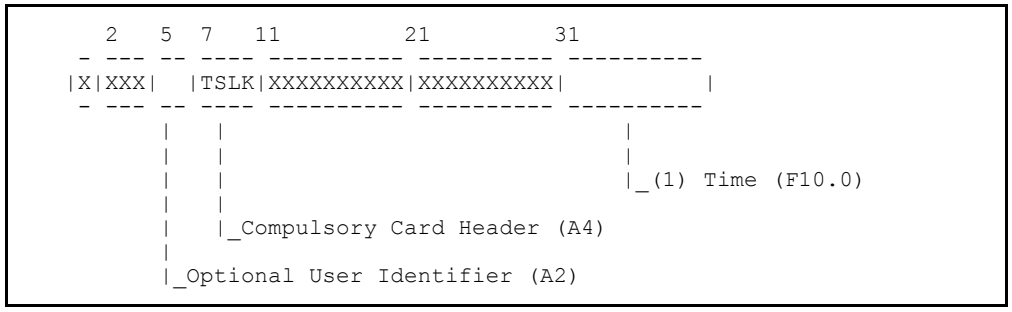


(1) The number of hours for which the expected peak stress is calculated

See Section 3.7 for exact details of usage.

A.6 The TSLK Card - Tether Printing when Slack

This card should only be input for installed tethers which are expected to go slack.



(1) Duration of time for which the user requires listing file output of the tether motions, forces and stress after the tether goes slack.

This card controls the listing file time history output for installed tethers. It should be used when the user **only** wants tether time history output when the tether goes slack. The TPRV card in Deck 18, which requests listing file output at specified time intervals should be omitted as it **overrides** this card.

The user specifies the time for which the time history of tether motion, forces and stresses should be output to the listing file when the tether goes slack, e.g. if 20 secs is input, then printing starts when the tether goes slack and continues every time step for 20 seconds. It is then switched off until the tether goes slack again.

Note: This card does not affect the output to the graphics backing file or statistics post-processing.

A.7 The TEGR Card - Tether Group Factor

This card should only be input for installed tethers.

The TEGR card specifies that a single tether should be considered as a group of tethers.

```
     2   5  7   11
 - --- -- ---- -----
|X|XXX|  |TEGR|     |
 - --- -- ---- -----
       |   |     |
       |   |     |
       |   |     |_(1) Tether group factor (F10.0)
       |   |
       |   |_Compulsory Card Header (A4)
       |
       |_Optional User Identifier (A2)
```

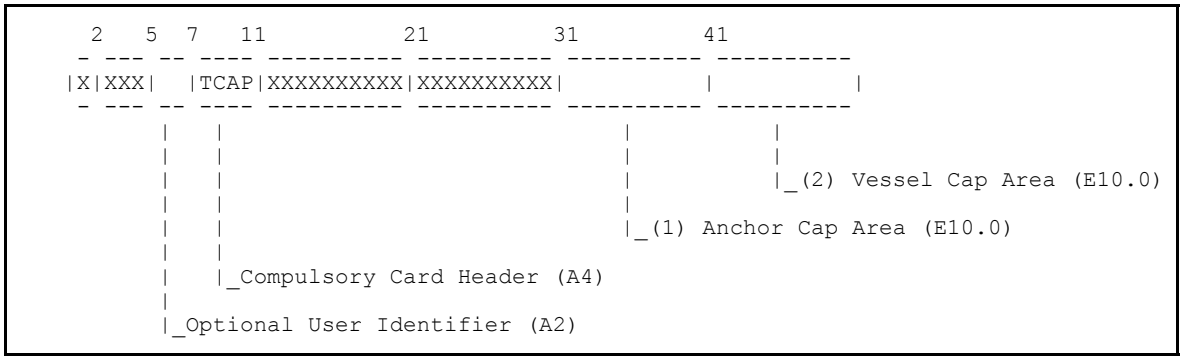
(1)

Number of tethers in this group.

This enables a group of tethers to be calculated as a single tether by the program and has the effect of multiplying the forces exerted on the vessel by the tether by a specified factor. It has no other effect.

A.8 The TCAP Card - Tether End Cap Areas

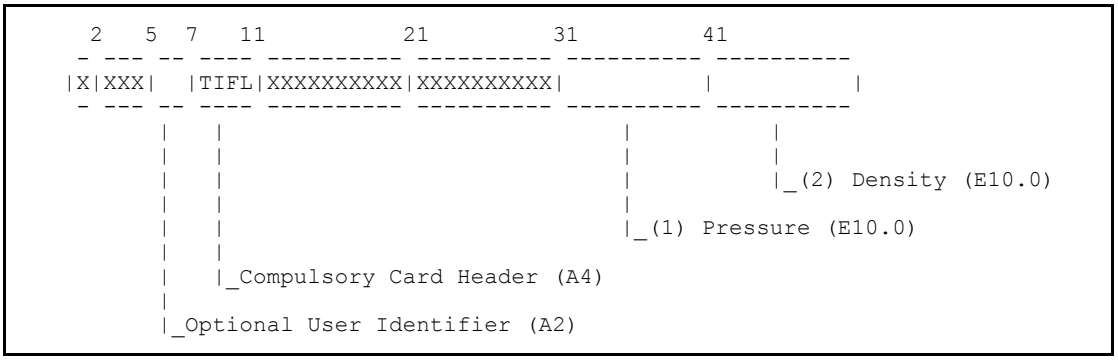
This card should only be input for installed tethers.



(1)-(2) The area which is not subject to external pressure by the water at the anchor and vessel ends. These values are used to calculate the tether effective/wall tensions.

A.9 The TIFL Card - Tether Internal Fluid Properties

This card should only be input for installed tethers.



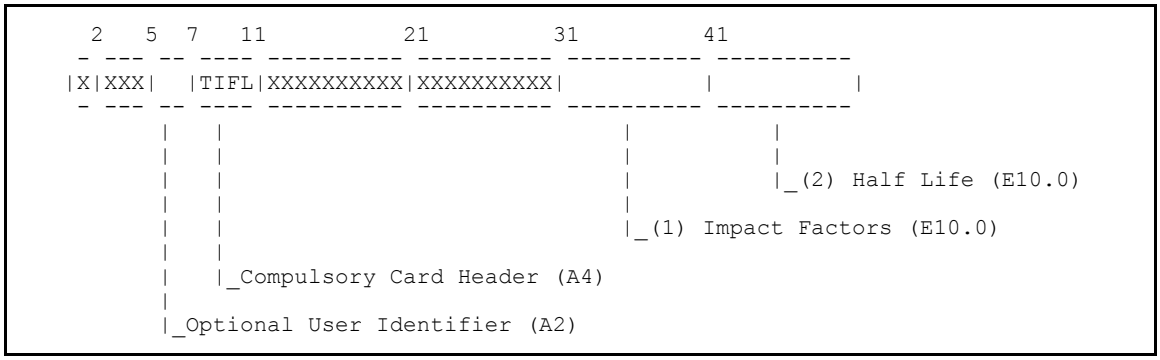
(1) The internal pressure of the tether

(2) The density of the internal fluid of the tether

These values are used to calculate the tether effective/wall tensions.

A.10 The TIMP Card - Tether Impact Parameters

This card should only be input for installed tethers.



(1) The stress impact factor.

The initial stress caused by tether impact is assumed to be proportional to the velocity of impact. The stress impact factor is the constant of proportionality, i.e.

initial axial stress = stress impact factor * impact velocity

(2) The half life duration of the impact.

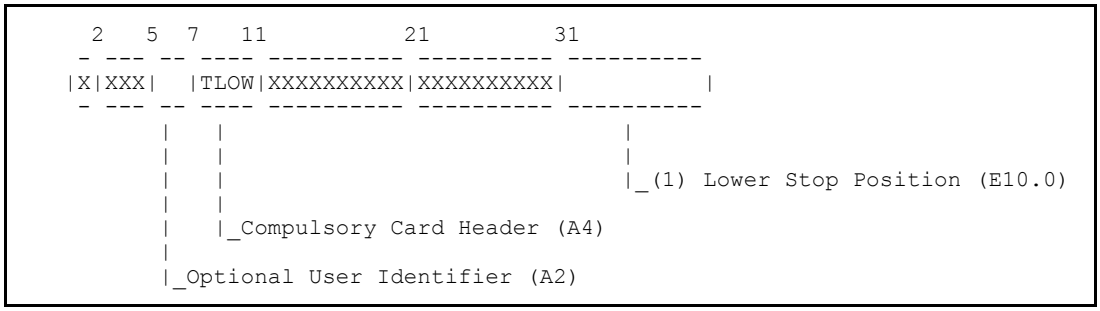
As the shock wave is reflected at the vessel and anchor ends it is assumed that the decay is exponential.

If the half life input above is t2, the axial stress due to the impact at a time t after impact is given by:

axial stress = initial axial stress * exp (-0.69315 t/t2)

A.11 The TLOW Card - Tether Lower Stop Position

This card should only be input for installed tethers.



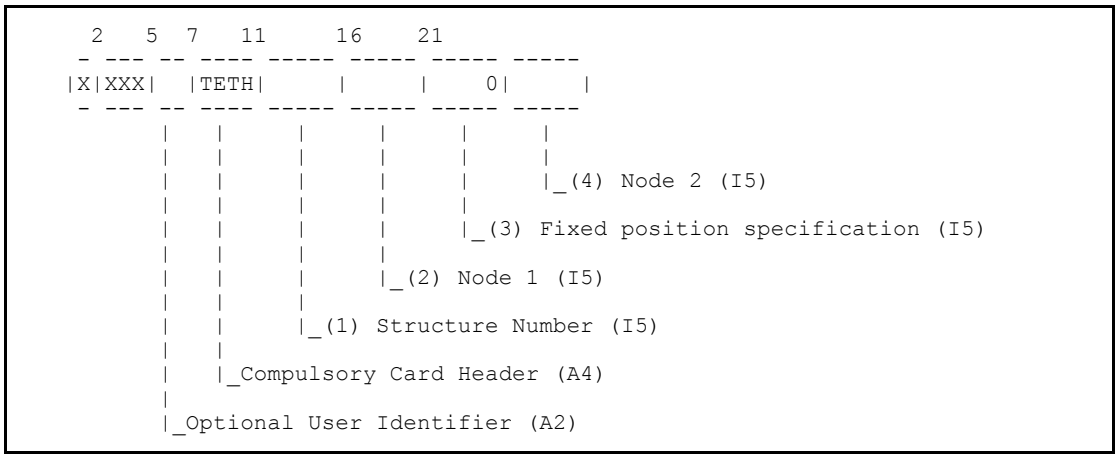
(1) The distance of the lower stop below the anchor. If the end of the tether is below this point, a warning will be issued. Note that, if the lower stop distance is input as zero, the tether can never be free hanging.

A.12 The TETH Card - Tether Vessel and Anchor/Trailing End Position

This card should be input after the tether has been fully described i.e. all the previous Cards have been input.

For towed tethers this should be the ***last*** and ***only*** TETH card in Deck 14.

For installed tethers, where in general there is more than one tether, a complete tether description may be duplicated by inputting a TETH card immediately following another. In this case, the previous tether will be duplicated at the positions specified by the structure/node numbers.



(1) The number of the structure/vessel to which the tether is attached. This must correspond to one of the structures defined in Deck 2. If '1' is input, this will correspond to the structure defined in Deck 'ELM1'. If '2' is input, this will correspond to the structure defined in Deck 'ELM2', etc. N.B. structure number '0' (i.e. a fixed node) is an **illegal** structure (in this position) and will produce an error.

For towed tethers, the structure number must be 1.

(2) This is the node number of the attachment point at the vessel end of the tether line on the structure specified (1). The position of this node on the vessel must have been defined in Deck 1.

(3)-(4) Specify structure number 0 (i.e. fixed in the FRA) and its corresponding node number (4) to define the anchor/trailing end of the tether. The position of this node (4) must have been defined in Deck 1.

A.13 The TSTE/TTIM/TRAO Cards - Pre-processing Analysis Requirement

These cards request special pre-processing analysis but are not yet available.

TSTE - Pre-Processing Tether Steady state required
TTIM - Pre-Processing Tether time history required with linear response of structure from database used
TRAO - Pre-Processing Tether RAOs required

A.14 The TLAC/TROC/TLAV/TROV Cards -Tether Constraint Cards

The user may specify up to five constraints on an installed tether. The constraints may be fixed:

TLAC - Tether fixed LAteral Constraint
TROC - Tether fixed ROtational Constraint

or attached to the vessel:

TLAV - Tether LAteral Vessel constraint (passes though 'gap' in structure)
TROV - Tether ROtational Vessel constraint (encastre condition on vessel)

The format of the input is as follows:

```
    5  7    11        21        31
---- -- ---- --------- --------- --------- ----
XXXX|  |TROC|XXXXXXXXX|XXXXXXXXX|XXXXXXXXX|XXXX
---- -- ---- --------- --------- --------- ----
XXXX|  |TROV|XXXXXXXXX|XXXXXXXXX|XXXXXXXXX|XXXX
---- -- ---- --------- --------- --------- ----
XXXX|  |TLAC|XXXXXXXXX|XXXXXXXXX|XXXXXXXXX|XXXX
---- -- ---- --------- --------- --------- ----
XXXX|  |TLAV|XXXXXXXXX|XXXXXXXXX|    0.100|XXXX
---- -- ---- --------- --------- --------- ----
      |   |                           |
      |   |                           |_(3) Gap between tether and structure
      |   |
      |   |_(2) Mandatory card header
      |
      |_(1) Optional 2 letter user identifier
```

(2) Note that the rotational constraints, TROC and TROV, are rarely used, as this will cause large bending moments at the attachment points. Weak/zero stiffness spring are normally used (see TSPA/TSPV cards).

(3) For a lateral constraint on the vessel, a gap can be specified, representing an opening which is wider than the tether. It is assumed to be a frictionless circular gap in the structure, vertically below the tether attachment point. If the total lateral movement relative to the centre of the gap is greater than the gap distance specified, the program will assume that the node at the gap is constrained laterally by the structure.

As forces on the tether are by definition in the XY plane of the tether axis system (TLA), the reaction on the structure must be at right angles to the TLA, i.e. for a vertical tether, the reactive force will be in the horizontal plane of the FRA. For a sloping tether, i.e. when the TLP is offset, there will be a small vertical (in the Z FRA) component equal to the total reaction multiplied by the sine of the slope of the Z axis of the TLA.

APPENDIX B - DETAILED CARD IMAGE DESCRIPTION OF DECK 18

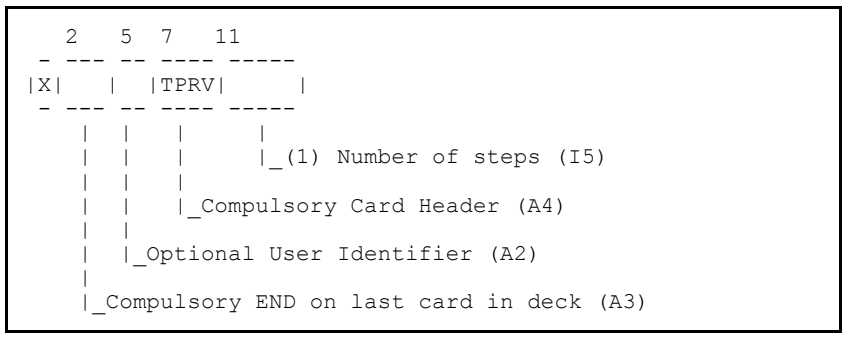
This section describes in detail the additional input data requirements for the printing, graphics and statistics post-processing of tether elements in Deck 18.

For a full description of Deck 18, see Section 4.18 of the AQWA Reference Manual.

A summary of the card input with parameters required is shown **below**. An * indicates data required.

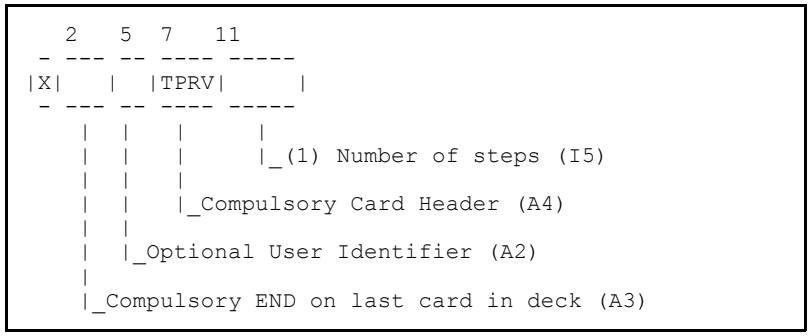
```
-------------------------------------------------
CARD   Description                    Integer (I5)
-------------------------------------------------
                         Start Column     11
-------------------------------------------------
AQWA-DRIFT/NAUT

TPRV - Tether L/Printer Printing Interval  *
TGRV - Tether Graphics/Statistics Interval *

AQWA-DRIFT Only

TSTS - Start  timestep for statistics      *
TSTF - Finish timestep for statistics      *
-------------------------------------------------
```

B.1 The TPRV Card - Tether L/Printer Printing Interval



(1) Enter a non-zero integer 'N' where listing file time history output for tethers is required every 'N' timestep.

B.2 The TGRV Card - Tether Graphics/Statistics Interval

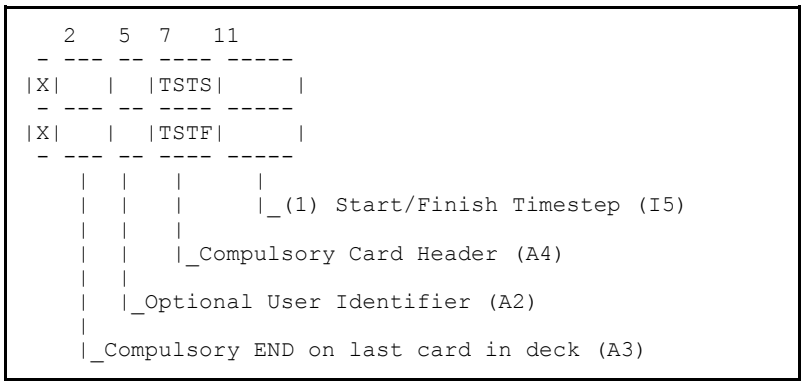


(1) Enter a non-zero integer 'N' where graphics output and statistics post-processing for tethers is required every 'N' timestep.

B.3 The TSTS/TSTF Card - Tether Start/Finish Timesteps for Statistics

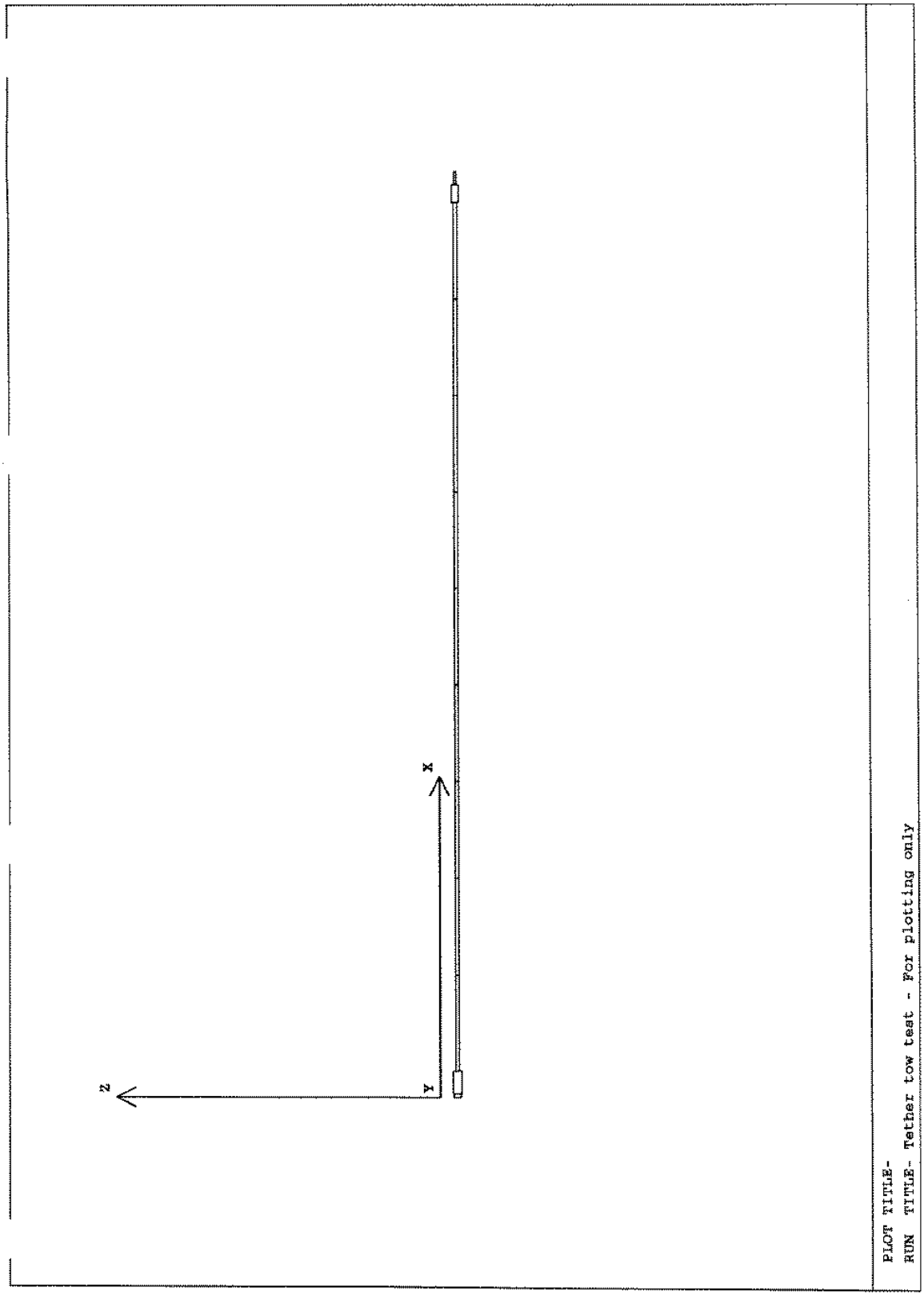
INPUT FOR AQWA-DRIFT ONLY.

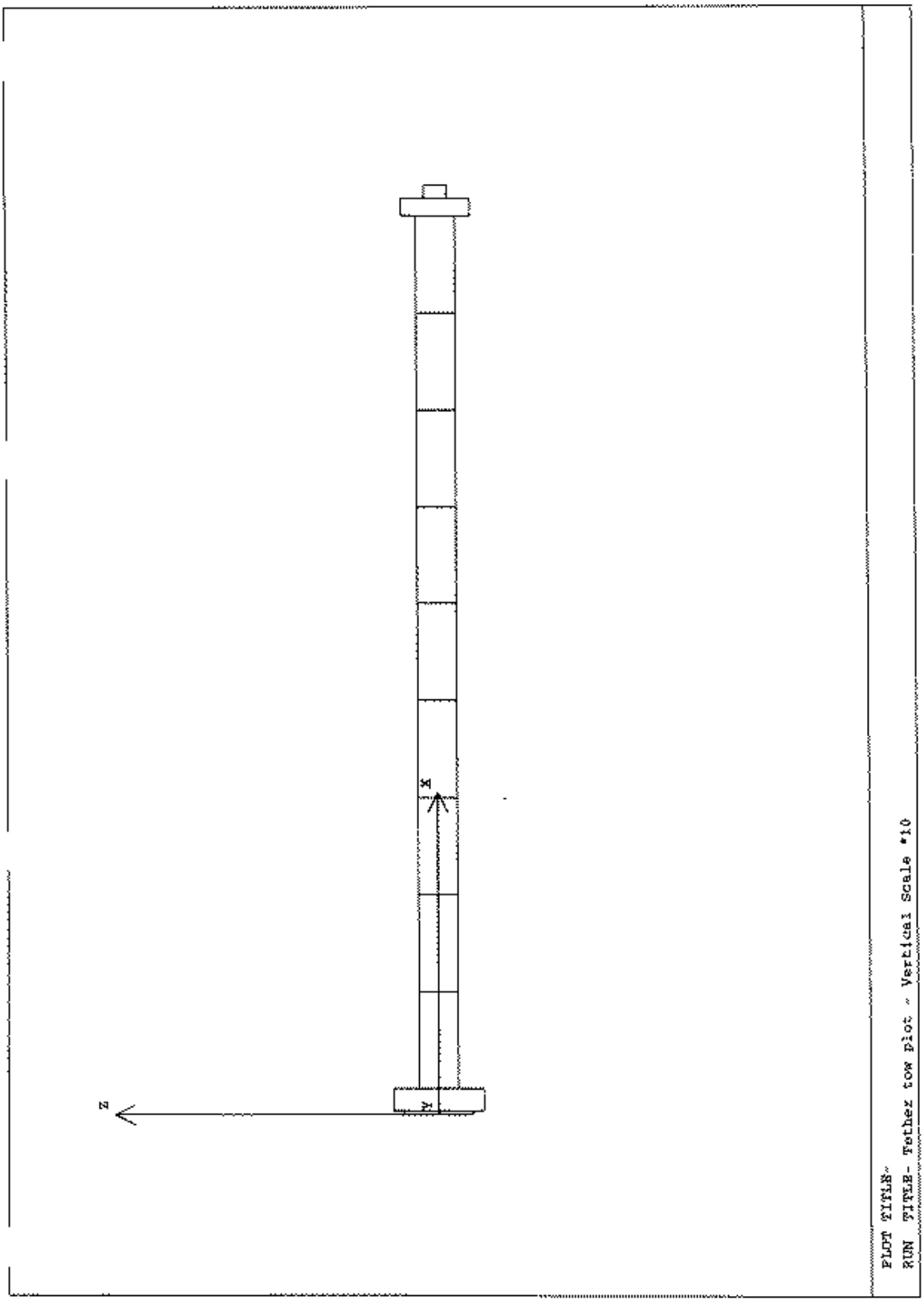
If these cards are not input tether statistics post-processing will be on all records specified by the TGRV Card.

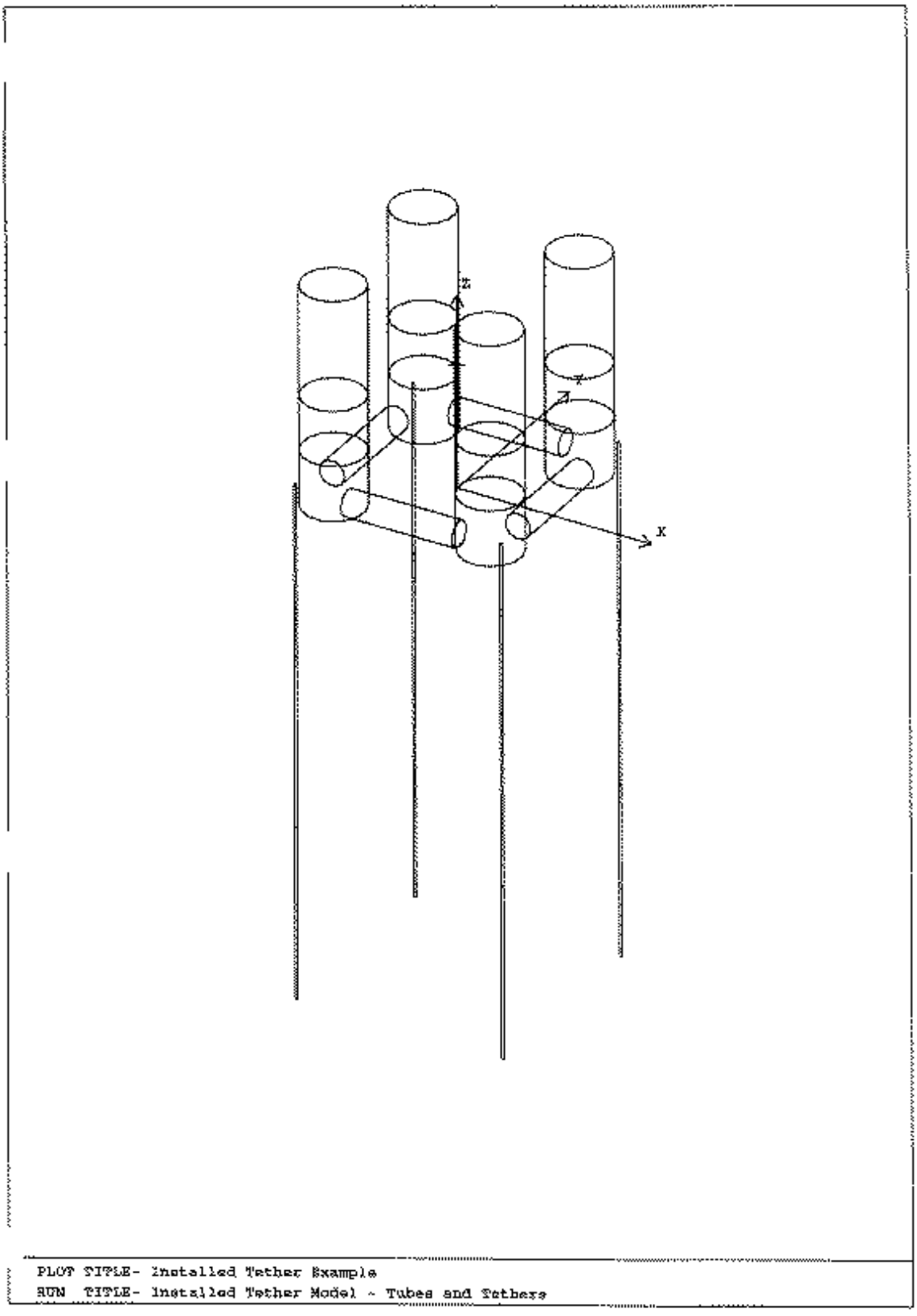


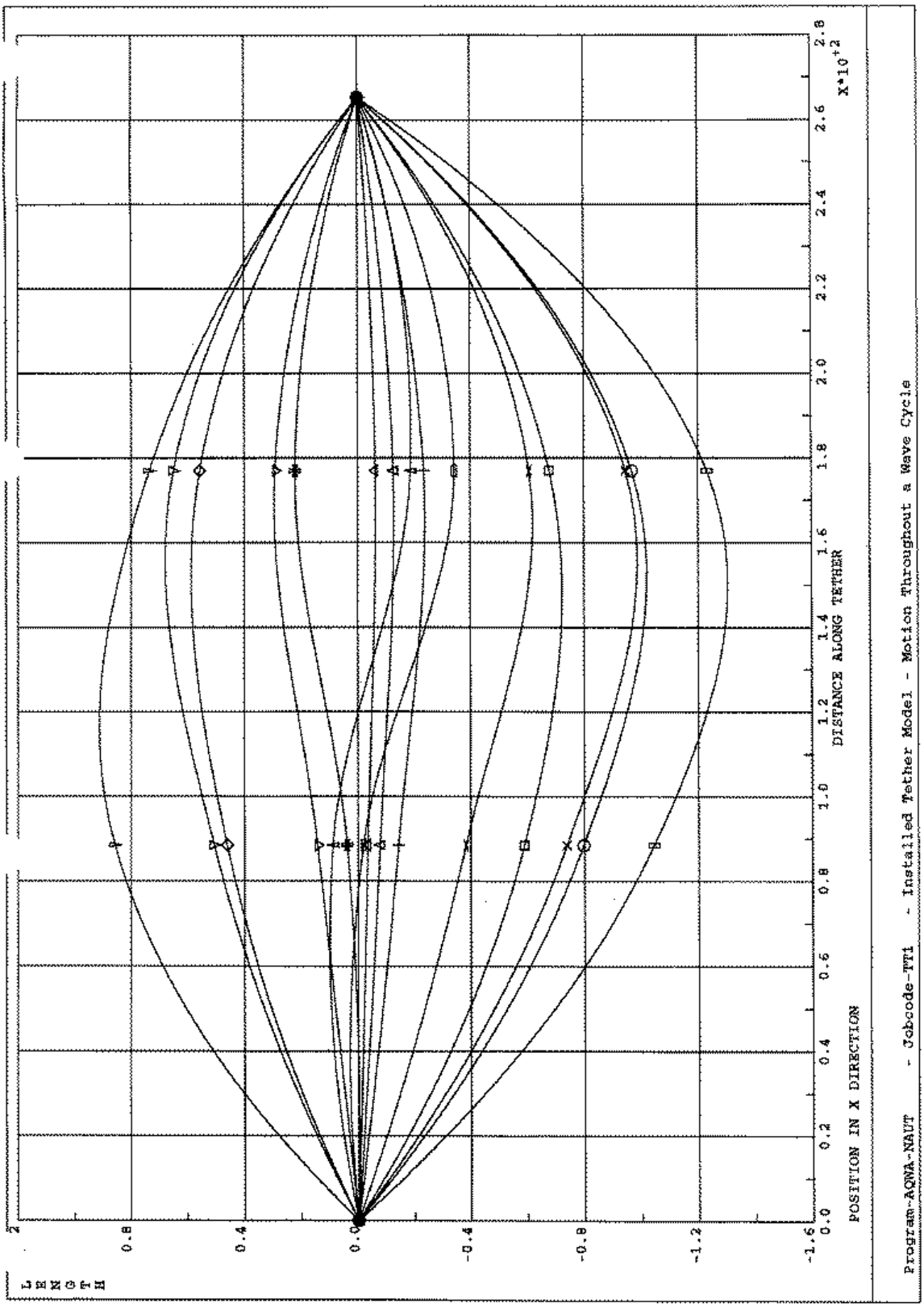
(1) Enter the timestep at which the tether statistics post processing should start (Default =1) on the TSTS card and the timestep at which the tether statistics post processing should finish (Default = last step) on the TSTF card.

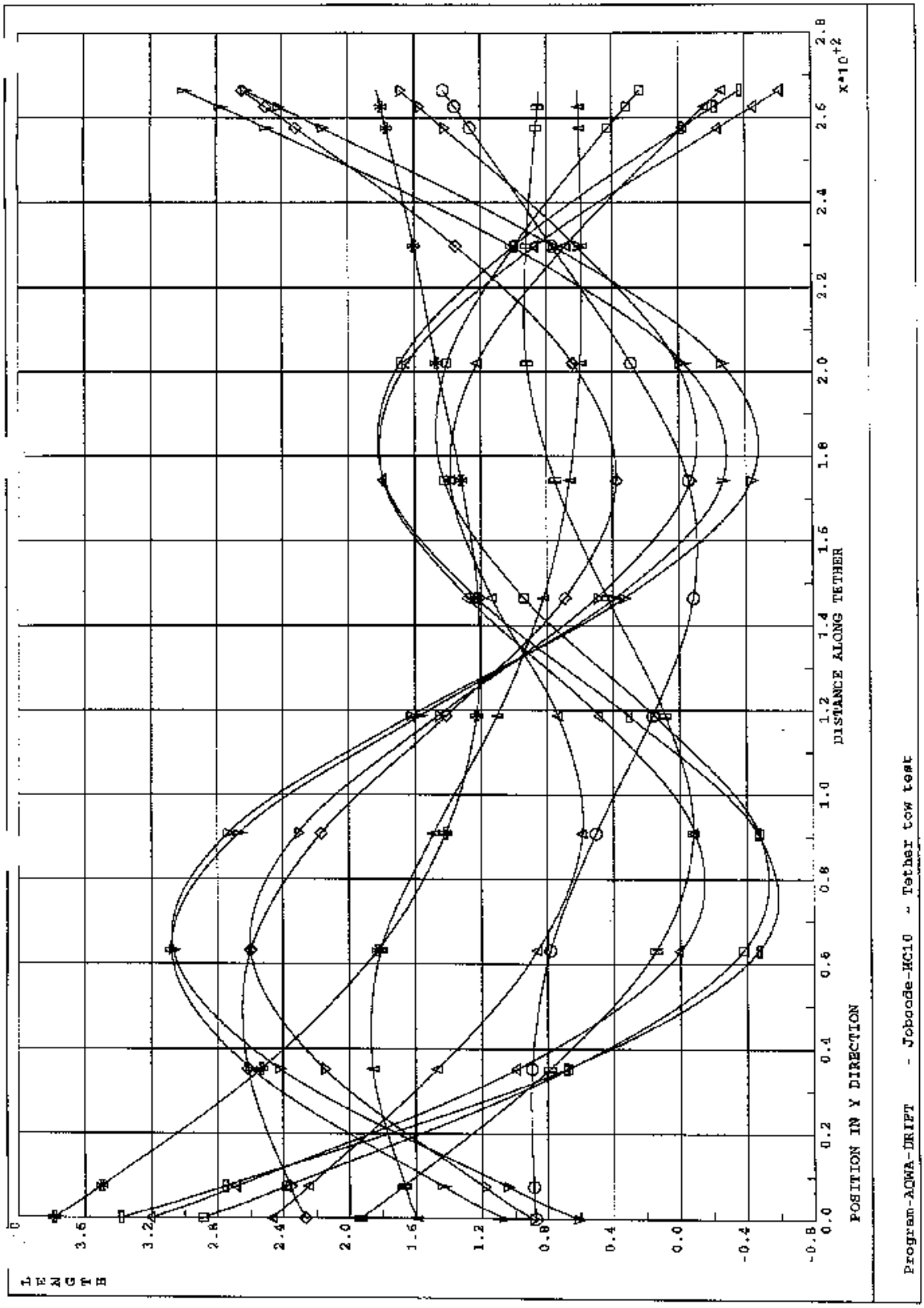
APPENDIX C - EXAMPLE GRAPHICS OUTPUT

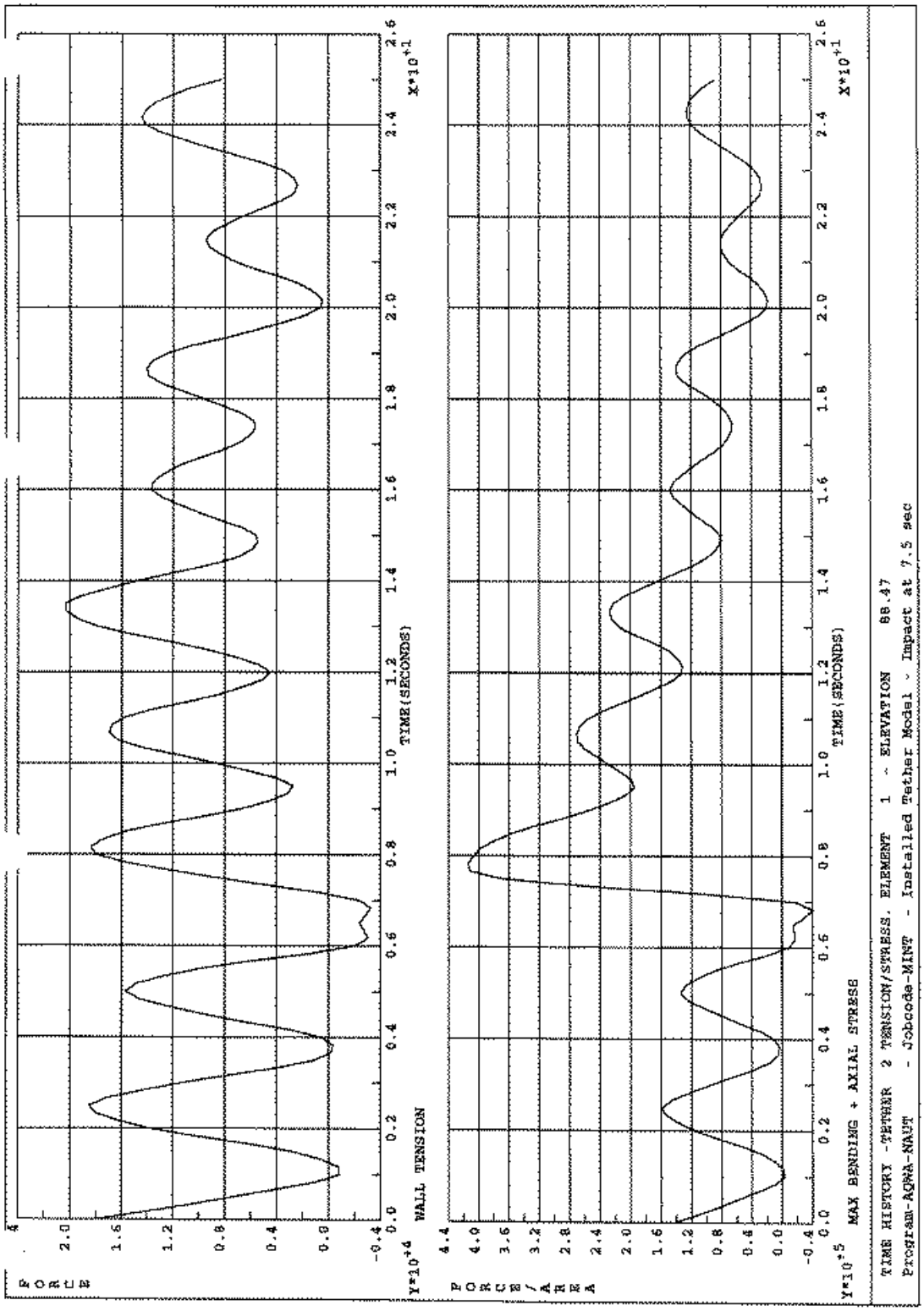

Z
X
PLOT TITLE-
RUN TITLE- Tether tow test - For plotting only


PLOT TITLE-
RUN TITLE- Tether tow plot - Vertical Scale *10


Z
Y
X
PLOT TITLE- Installed Tether Example
RUN TITLE- Installed Tether Model - Tubes and Tethers


Program-AQWA-NAUT - Jobcode-TT1 - Installed Tether Model - Motion Throughout a Wave Cycle
POSITION IN X DIRECTION
DISTANCE ALONG TETHER
X*10**2
LENGTH


Program-AQWA-DRIFT - Jobcode-HC10 - Tether tow test
POSITION IN Y DIRECTION
DISTANCE ALONG TETHER
x*10**+2
TENSION


FORCE
WALL TENSION
Y*10**4
TIME(SECONDS)
X*10**1
FORCE/AREA
MAX BENDING + AXIAL STRESS
Y*10**5
TIME(SECONDS)
X*10**1
TIME HISTORY -TETHER 2 TENSION/STRESS, ELEMENT 1 - ELEVATION 88.47
Program-AQWA-NAUT - Jobcode-MINT - Installed Tether Model - Impact at 7.5 sec