FATFREE

FATIGUE ANALYSIS OF FREE SPANNING PIPELINES

FatFree Suit v13.0.1
FatFree GUI v13.0.1

DNV·GL

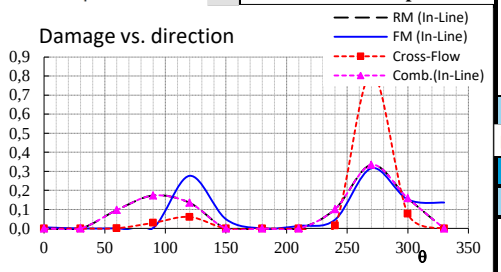
Support:
Software.Support@dnvgl.com

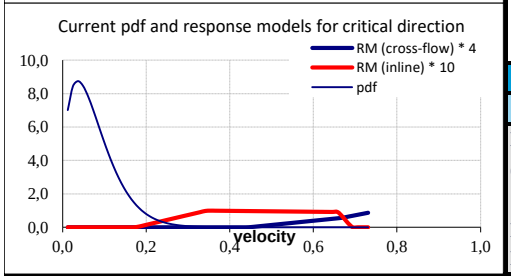
FATFREE IS READY
License status: OK. License expires in 375 days.

Project: Example 03 **Date:** **Calculations by**
References: **Verified by**

Calculation options	Code	Free Span Scenario	Response Data	Soil Properties	SN-Curve, cap position	SN-Curve, root position	Safety Factors
Multi-mode	RP-F105	Flat sea-bed	RP-F105 Span	User Defined	F1 (seawater cp)	F1 (seawater cp)	MEDIUM

Return Period Values	Directionality	Current Modelling	Current Sheet Name
Automatic Generated	Discrete - C dir.	Uc Weibull pdf	Current Template





h [m]	165	f_1 (in-line)	0,620	ζ_{struc}	0,005	m_1	3	m_1	3	Not well defined	
L [m]	40	f_1 (cr-flow)	0,813	ζ_{soil} (in-line)	0,020	m_2	5	m_2	5	η	0,50
e [m]	0,88	A_1 (in-line)	131	ζ_{soil} (cr-flow)	0,014	$Log(C_1)$	11,299	$Log(C_1)$	11,299	γ_k	1,15
d [m]		A_1 (cr-flow)	134	$\zeta_{h,RM}$	0,0000	$Log(C_2)$	14,832	$Log(C_2)$	14,832	$\gamma_{f,IL(inline)}$	1,20
θ_{pipe}	0,0	λ_1	1,290	K_S(in-line)	0,62	$logN_{sw}$	6,00	$logN_{sw}$	6,00	$\gamma_{f,CF(cr-flow)}$	1,20
D [m]	0,329	δ/D	1,06	K_S(cr-flow)	0,47					γ_S	1,30
L/D_s	124	S_{eff}/P_E	-0,44	K_V	1,330E+07	SCF	1,40	SCF	1,00	$\gamma_{on,IL}$	1,10
Wave Modelling		**Wave Sheet Name**		K_L	1,000E+07	R_{cap}	0,161	R_{root}	0,146	$\gamma_{on,CF}$	1,20
Hs Weibull pdf		**Wave Template**		$K_{V,S}$	2,500E+05					Ψ_R	1,00

STRUCTURAL MODELLING

Coating data		Functional Loads		Pipe Dimensions [m]		Constants		Densities [kg/m^3]		Special input	
k_c	0,00	H_{eff} [N]	9,00E+04	D_s	0,3228	ν	0,30	ρ_{steel}	7850	Normal	
f_{cn} [Mpa]	42	p [bar]	124,54	t_{steel}	0,0150	α [$^oC^{-1}$]	1,17E-05	$\rho_{concrete}$	0	$R_{S,C}$	-
k [m]	3,3E-03	ΔT [^oC]	0,02062	$t_{concrete}$	0,0000	E [N/m^2]	2,07E+11	$\rho_{coating}$	935	$R_{S,W}$	-
				$t_{coating}$	0,0030			ρ_{cont}	200	$R_{IL,strakes}$	-
										$R_{CF,strakes}$	-
										$R_{CF\text{-}ind\text{-}IL,strakes}$	-

RESULTS

FATIGUE LIFE

In-line (Response Model)	**2,96E+02**	**yrs**
Cross-Flow	**2,56E+04**	**yrs**
In-line (Force Model)	**5,28E+05**	**yrs**
In-line (Combined)	**2,95E+02**	**yrs**

DYNAMIC STRESS [MPa]

Cross-flow	Peak	Von Mises	Inline	Peak	Von Mises
σ_x(1 year)	0,0	110,7	σ_x(1 year)	15,1	96,0
σ_x(10 year)	4,2	114,5	σ_x(10 year)	21,0	95,9
σ_x(100 year)	16,4	125,6	σ_x(100 year)	33,0	96,7