DNV·GL

# C++ IO support for various FEM exchange file formats

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## 1 Supported FEM file formats

Not all functionality defined for the exchange file formats is supported. The supported subset is currently mainly defined by the functionality supported in GLFrame rspt. the BMF file format.

More detailed information on supported functionality can be found in the according directories in the doc dubdirectory.

### 1.1 NASTRAN Bulk Data Format (BDF)

#### 1.1.1 BDF Cards supported

| | Name | Description | Read | Write |
|---|---|---|---|---|
| General | | | | |
| | `MAT1` | Material definition | ✓ | |
| | `GRID` | Grid nodes | ✓ | |
| Elements | | | | |
| | `CTRIA3` | 3 node shaped shell elements | ✓ | |
| | `CQUAD4` | 4 node shaped shell elements | ✓ | |
| | `CBEAM` | Complex beams | ✓ | |
| | `CBAR` | Simple beams | ✓ | ✓ |
| | `CROD` | Trusses | ✓ | |
| Element | properties | | | |
| | `PSHELL` | Properties for `CTRIA3`, and `CQUAD4` | ✓ | |
| | `PBEAM` | Integral properties for `CBEAM` | ✓ | |
| | `PBEAML` | Properties for `CBEAM` describing cross section | ✓ | |
| | `PBAR` | Integral properties for `CBAR` | ✓ | |
| | `PBARL` | Properties for `CBAR` describing cross section | ✓ | |
| | `PROD` | Properties for `CROD` | ✓ | |
| Load | | | | |
| | `LOAD` | Load case combination | ✓ | |
| | `FORCE` | Forces on Nodes | ✓ | ✓ |
| | `MOMENT` | Moments on Nodes | ✓ | ✓ |
| Misc | | | | |
| | `ENDDATA` | Marker for end of input file | ✓ | ✓ |

## 1.2 DNV GL Seasam Input Interface File (FEM)

### 1.2.1 FEM Cards supported

| | Name | Description | Read | Write | Page[1] |
|---|---|---|---|---|---|
| General | | | | | |
| | DATE | Date and Program Information | ✓ | ✓ | 4-2 |
| | GCOORD | Nodal Coordinates | | | 6-56 |
| | GNODE | Correspondence between External and Internal Node Numbering, and Number of Degrees of Freedom of Each Node | ✓ | ✓ | 6-80 |
| | IDENT | Identification of Superelements | ✓ | ✓ | 4-3 |
| | IEND | End of a Superelement | | | 4-4 |
| Elements | | | | | |
| | GELMNT1 | Element Data Definition | | | 6-65 |
| | GELREF1 | Reference to Element Data | | | 6-66 |
| Element | properties | | | | |
| | GBARM | Cross Section Type Massive Bar | | | 6-48 |
| | GBEAMG | General Beam Element Data | | | 6-49 |
| | GECCEN | Eccentricities | | | 6-61 |
| | GELTH | Thickness of Two-dimensional Elements | | | 6-70 |
| | GIORH | Cross Section Type I or H Beam | | | 6-71 |
| | GLSEC | Cross Section Type L-Section | | | 6-76 |
| | GPIPE | Cross Section Type Tube | | | 6-81 |
| Load | | | | | |
| | BLDEP | Nodes with Linear Dependence | | | 6-27 |
| | BNBCD | Nodes with Boundary Conditions | | | 6-30 |
| | BNDISPL | Nodes with Prescribed Displacements and Accelerations | | | 6-31 |
| | BNLOAD | Nodes with Loads | | | 6-35 |
| | MGSPRNG | Element to Ground | | | 6-103 |
| Misc | | | | | |
| | GSETMEMB | Set (group) of Nodes or Elements (Members) | | | 6-84 |
| | GUNIVEC | Specification of Local Element Coordinate System | | | 6-92 |
| | MISOSEL | Isotropy, Linear Elastic Structural Analysis | | | 6-115 |
| | TDSETNAM | Name and Description of a Set (group) | | | 4-7 |
| | TEXT | User supplied Text | ✓ | ✓ | 4-10 |
| | TDLOAD | **not documented** | | | |

[1] References page in "Technical Report: Sesam Input Interface File, File Description", Document id: 89-7012, Revision Number 9 / 01 November 1996