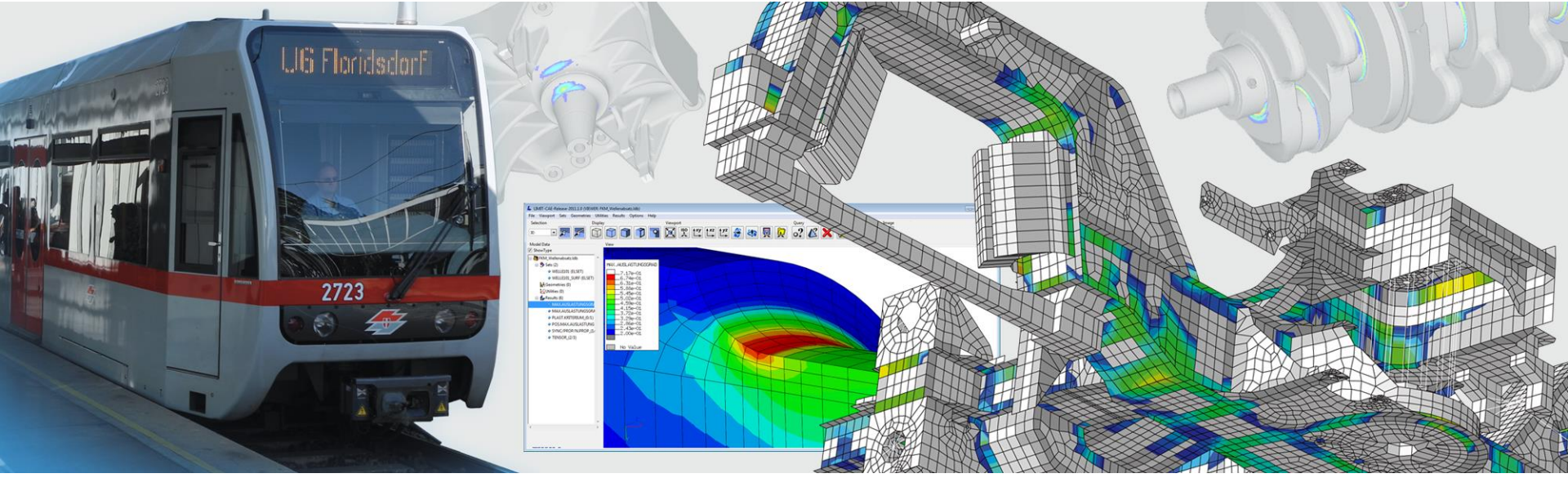


Interface LIMIT – Nastran/Optistruct/Radioss

Importing the.bdf-file into *LIMIT-CAE*:

- File ending must be .bdf or .dat
- Optistruct:
  - Export model with standard format
  - Import .fem
- Radioss:
  - Export model with bulk data standard format
  - Import .fem
- Nastran (.bdf; must be ‚sorted bulk data' **in** the ‚short' format!)

Specification of the interface

- **Maximum nodenumber respectively elementnumber :**
  - Windows 64 bit (x64): 20000000
- **Maximum number of nodes :**
  - Windows 64 bit (x64): 3000000
- **Maximum number of elements :**
  - Windows 64 bit (x64): 4000000
- **These LIMITS can be changed by the user. See document LIMIT_2017, section: *Redimensioning of Arrays***
- **Coordinate systems:**
  - Nodes
    - Definition in the global coordinate system
    - Definition using CORD1R or CORD2R (RECTANGULAR)
  - Result data must exist in the global system (Solids) respectively in the default element system (shells).

Following elements can be analyzed:

- **Solids:**
  - CTETRA (4 nodes) (not suitable for stress assessment)
  - CPENTA (6 nodes) (less suitable for stress assessment)
  - CHEXA (8 nodes) (less suitable for stress assessment)
  - CTETRA (10 nodes) => stress gradiant available
  - CPENTA (15 nodes) => stress gradiant available
  - CHEXA (20 nodes) => stress gradiant available

- **Shells:**
  - CQUAD4
  - CQUAD8
  - CTRIA3
  - CTRIA6

Solid assessment :

- **Goal of a LIMIT FKM proof of strength :**
  - Assessment of surface stresses (2D-tensors)
  - Popular method and conservative
- **Free surfaces :**
  - Are necessary for the consideration of stress gradients normal to the surface
  - Are identified by the software LIMIT
  - Can be generated by covering the solids with 2D-elements (skin) in the preprocessor.
- **2D-skin elements can be assessed as well**
  - But without supporting effect of stress gradient => conservative
  - This leads to considerable less data
- **Supporting effect of stress gradient is only possible with solids!**
  - Results of a 3D analysis with good element quality and fine mesh are more precise than results of 2D-skin elements.

Modifications for OP2-Output:

(without these adjustments the assessment doesn‘t work!)

- **sort: SORT1**
- **Data format: REAL**
- **Yield criteria: VONMISES**
- **Position: BILIN (necessary for analyzing the gradient) or CORNER**

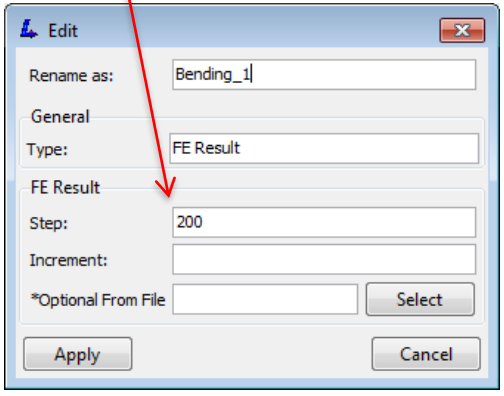
e.g. STRESS(SORT1,REAL,VONMISES,CORNER)=ALL

Note: LIMIT can average corner values, which is activated with the key *CENTER_STRESS

- **Geometry must be written to .op2-file:** **PARAM, POST, -1**
  PARAM, OGEOM, YES

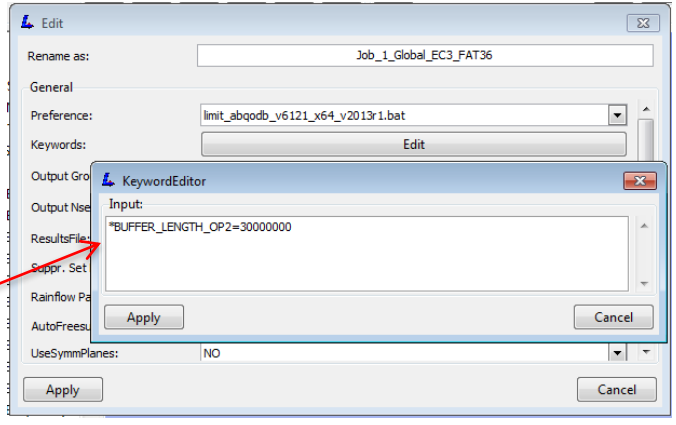
Addressing FE Results in the LoadManager:

- The Step refers to the SUBCASE number in the input deck




```
$HMNAME LOADSTEP
1"Torsion"
SUBCASE       100
  LABEL= Torsion
  SPC =         1
  LOAD =        2
  ANALYSIS = STATICS
$
```

- Maximum SUBCASE number is limited to **1000000** but can be increased in JobManager > Edit > Keywords > Edit:
e.g. *BUFFER_LENGTH_OP2=30000000



Possible reasons for errors:

- **If the .bdf-file contains the line ‚PARAMOMACHER=YES', parts of the .op2-file are written in double precision. This leads to an abortion during reading the .op2-file**
- **No geometry written to .op2-file. See previous slide.**

Last slide