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Release Notes USFOS Version 7-5

DISTRIBUTION

Members of USFOS User Group		x	x

FILE CODE	CLASSIFICATION
	restricted

ELECTRONIC FILE CODE

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PROJECT NO.	DATE	PERSON RESPONSIBLE/AUTHOR	NUMBER OF PAGES
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Release notes
USFOS 7-5 1998

Contents:

1. Introduction

The current version of USFOS (version 7-5) is an *intermediate* release of the 97-98 User Group development period. This version will be replaced by the final version with all extension included during spring 1999. This (1999) version is the on which will "cross the line" into the year 2000. As USFOS does not use date as input to the calculations (print of time for analysis initiation only), the change from year 1999 to 2000 is expected to cause *no* problems.

2. Development Activities

Status for the 97-98 development:

SPARSE:

Sparse equation solver is now implemented for both static and dynamic analysis. For typical large models this means speedup in the range 2-10 compared to the previous used solver. The sparse technique used for eigenvalue problems will be implemented during 1998.

Pile-Soil

Interface to GENSOD

Interface to GENSOD is implemented. A separate tool (named g2u) converts the gensod binary data file to USOFS input commands. The interactive tool is accessed by typing:

usfos soil

Automatic generation of P-Y, T-Z and Q-Z according to API 1993

The command *API_SOIL* is implemented which means that USFOS generates the P-Y, T-Z and Q-Z curves according to API 1993 based on the input soil data (s_u,ε_{50} etc for clay, friction data, Φ δ etc for sand). This option reduces the required input to USFOS to a very minimum in connection with foundation modelling.

Pile group effects

"Pile group effects" is planned for implementation during 1998.

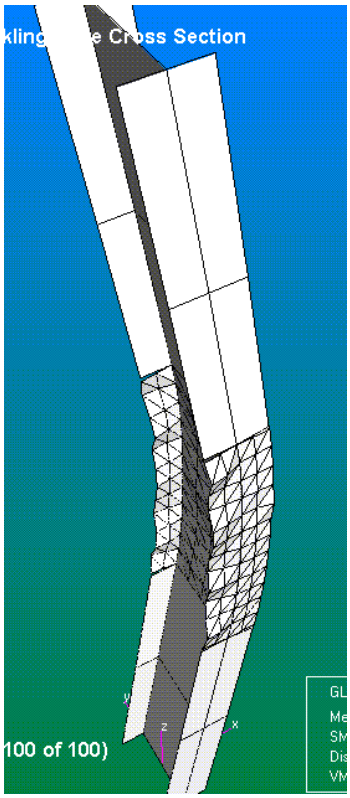
Local Model Effects

This activity will be completed in 1998 according to the plans. However, a *demo* version of the local shell option (the USFOS *shell-beam element*) is available in the 7-5 version.

Several examples are enclosed on the "example" directory: ($USFOS_HOME/examples)

On the picture to the right, local buckling of a I profile is demonstrated. The model consists of three beam elements, the one in the middle is utilizing the *subshell* option.

The performance of the nonlinear shell element (resultant plasticity formulation) is described in a separate SINTEF report.



Dynamic Analysis Results

A typical dynamic analysis (earthquake, explosion, etc) implies a large number of analysis steps. A new option gives the user the possibility to save selected data every time step during the dynamic analysis, independent of the XFOS result database build-up (typically saved every *n*'th step). The selected results (which are stored on a separate file with extension *.dyn*), are accessed through xfos. Export of data to time series result analysis tools will be implemented during 1998.

Design Option, Calibration to Column Buckling Curves

Local buckling
Member imperfections may be assigned automatically to produce member buckling in accordance with the column buckling curve selected by the user (API, NPD, SSRC, EUROCODE etc).

Node imperfection (global buckling)

This activity is "below the line" according to the priority list, but will be executed during 1998 if any extraordinary income is available, otherwise moved to the next development period.

Animation

According to the priority list decided by the steering committee this activity would not be executed within the available funding. However, this activity option is partly executed paid by one company (Norsk Hydro). From xfos it is possible to select and produce data to be visualised in "*glview*" or "*sesam viewer*".

3. New input identifiers

Since last release, following input identifiers are added:

INI_VELO	:	Initial velocity of specified node(s) or bodies (materials).
DampRatio	:	Structural damping given in terms of damping ratios (and associated frequencies). Time dependent (optional).
DynRes_N	:	Dynamic Result, Nodal data
DynRes_E	:	Dynamic Result, Element data
DynRes_G	:	Dynamic Result, Global data
CINIDEF	:	Analysis Calibration to column buckling curves
API_SOIL	:	Automatic calculation of P-Y, T-Z and Q-Z according to API 1993
MAXWAVE	:	Automatic detection of the "worst" wave phase to be applied in a 'pushover' analysis.
WAVMXSCL	:	Scaling (du to units) the wave forces found using the MaxWave option.
WAVE_INT	:	User control of the number of integration points to be used along the different beam elements when calculating wave loads.
COROLOAD	:	Specification of distributed element loads in local coordinate system.
INVISIBLE	:	Making non-linear springs invisible in xfos, (f ex contact springs).
USERFRAC	:	User defined fracture. "Old" identifier, but extended options (Loadcomb/Loadlevel, Time, Utilization, Strain)
ACTIVELM	:	Specification of elements to be "waked up" at a given loadcomb. "Old" identifier, but extended to Dynamic Analysis.

4. Miscellaneous

- USFOS version 7-5 is 100% compatible with the previous versions, but the new version allows the user to specify characters instead of numbers in the input. (F ex *Sand* instead of *3* for the soiltype specified under the command API_SOIL). Implementation of this new feature on 'old' commands will be completed during 1998.
- The USFOS FE model, and member forces calculated by USFOS are automatically exported to SESAM SIF file, for code checking and model verification in FRAMEWORK. *(POSTFOS command : X-PRINT-FRAMEWORK <filename> <lcomb> <lstep> 0 0)*