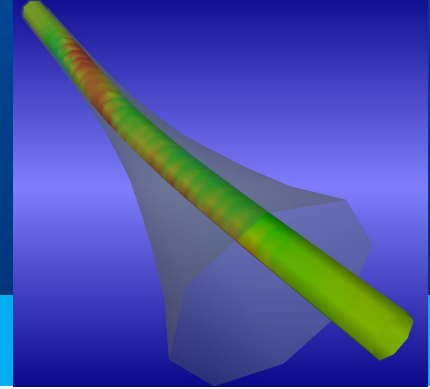


# MARINTEK FACT SHEET

## BLEX



### BFLEX - Program System - Version 2.15 / 2004-12-12

The BFLEX Program System is a special-purpose computer tool for analysis of extreme stresses and fatigue in the tensile- and pressure armour layers of flexible pipes. Thus the application area is typically a detailed cross-sectional analysis of the last 10-15 meters of a riser close to the termination point on the vessel, as illustrated in Figure 1.

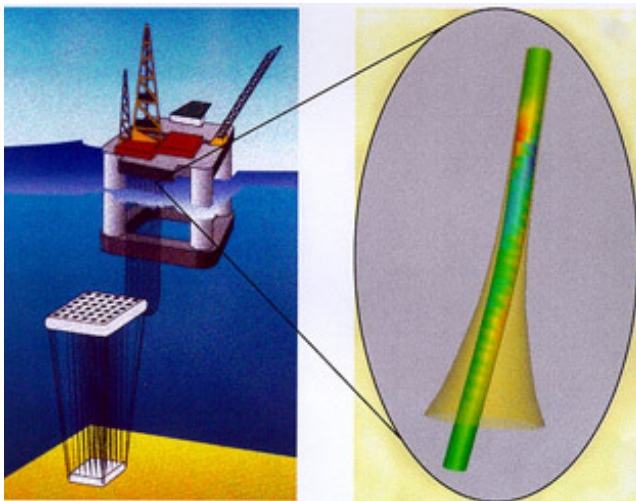


Figure 1. A typical BFLEX model, the last 15 meters of the riser close to the vessel, also including a bell-mouth.

#### System overview

An overview of the BFLEX Program System is shown in Figure 2. The main system components are:

- BFLEX Analysis Modules (BFLEX, PFLEX, LIFETIME, BOUNDARY, TEMPERATURE)
- FEM/RAF Result Database

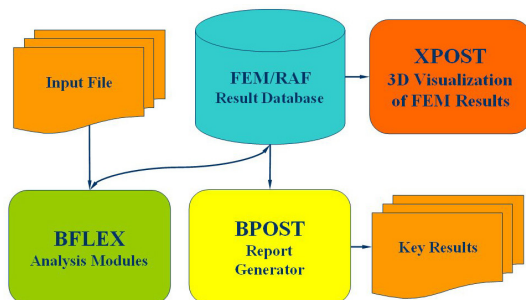


Figure 2. The BFLEX Program System.

- BPOST Report Generator
- XPOST 3D Visualization of FEM Results

#### Functionality

The BFLEX Analysis Modules currently include the following functionality:

- The BFLEX module, reading and controlling all input data needed for all modules, and performing tensile armour stress analysis
- The PFLEX module, performing pressure spiral bending stress analysis
- The LIFETIME module, performing fatigue analysis
- The BOUNDARY module, performing transverse cross-sectional stress analysis of the pressure armour layer
- The TEMPERATURE module, performing temperature analysis

As shown in the system overview, all modules communicate through a common result database. BFLEX performs the global pipe analysis including tendon stress analysis. The results from this analysis is then used as input to the PFLEX pressure spiral stress analysis. The PFLEX model includes a limited number of pitches representing a specific pipe position selected by the user. Having obtained the stress variation from these analyses, LIFETIME performs fatigue analyses based on the obtained stress ranges and given fatigue data for each layer.

The different analysis modules also reflect the global/local modelling philosophy behind the BFLEX Program System, as illustrated in Figures 3, 4 and 5.

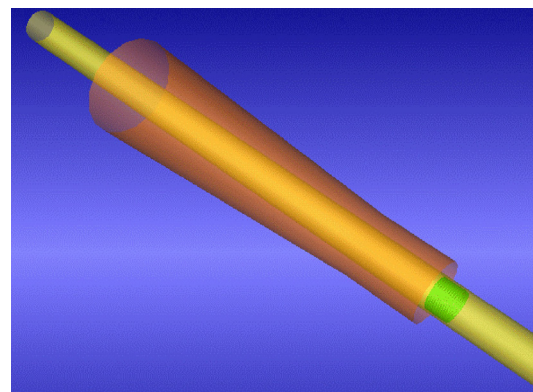


Figure 3. The global (BFLEX) model.

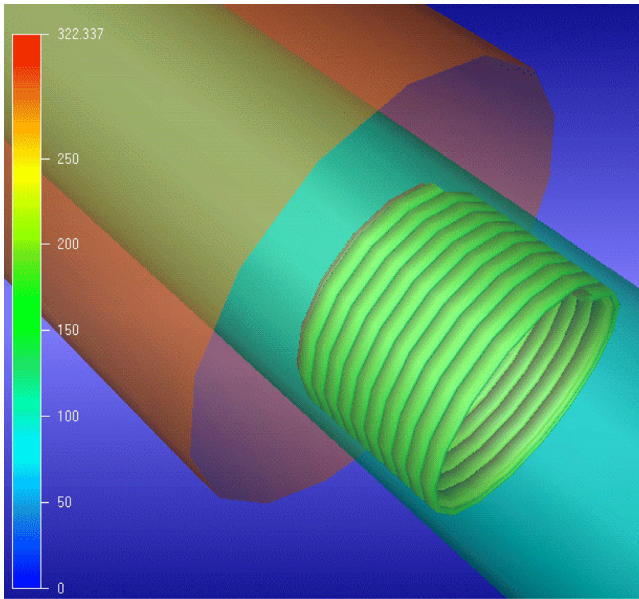


Figure 4. A detailed (zoomed) view of the pressure armour model (PFLEX), placed at the tip of the bend stiffener.

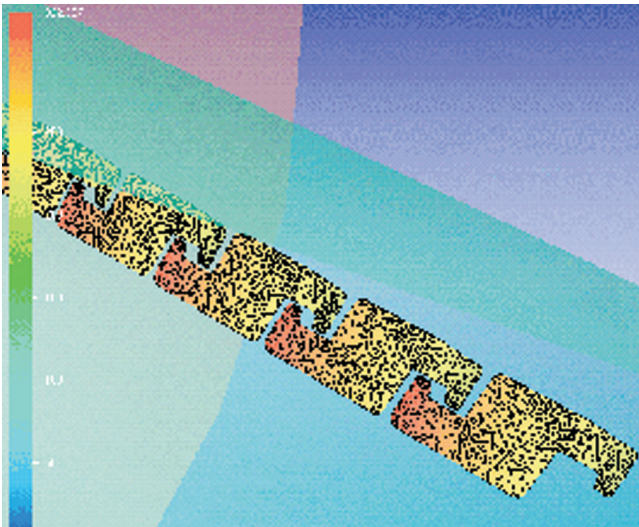


Figure 5. A cross-sectional cut in the pressure armour layer, thus representing the most detailed BFLEX modeling level (BOUNDARY).

## Computer platforms

The standard computer platform for the BFLEX Program System is PC's running Windows 2000 (or newer). UNIX versions can be delivered, but will imply an additional cost.