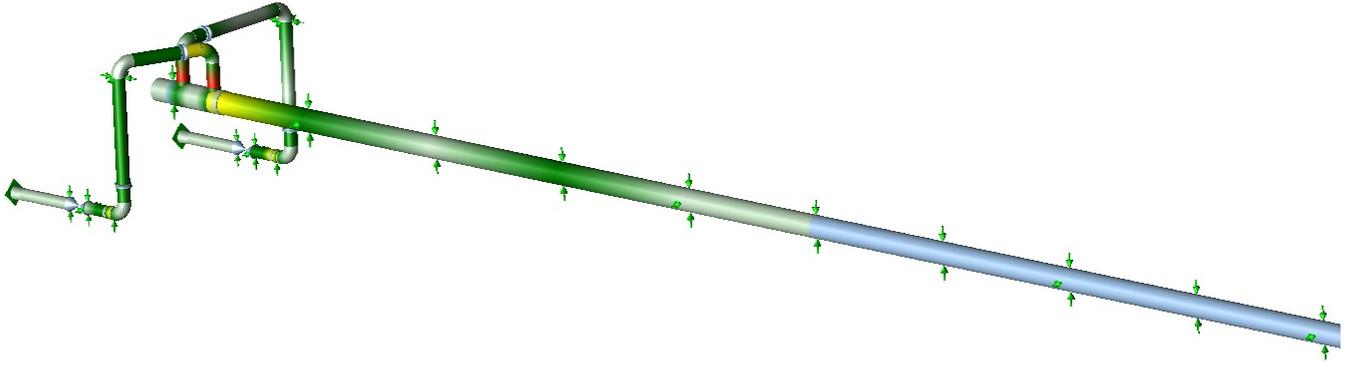


# Pipe-stress analysis



Case: New 30" piping in existing pipe system, Dow Terneuzen (2008)

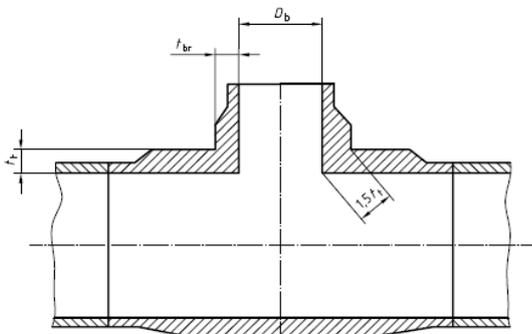
The strength of this pipe system is examined using pipe-stress analysis.

After specifying different piping components, these components are used to compose a pipe system. Subsequently, the complete system is tested for strength in longitudinal direction.

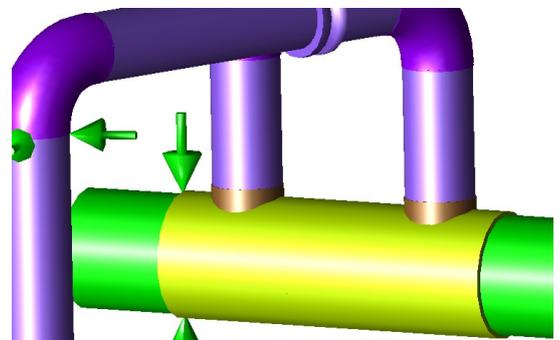
To perform the pipe-stress analyses, Engiplast makes use of the calculation programme CAESAR II, which is used to perform analyses according to the most important standards, including ASME B31.1, B31.3 and B31.8, BS806, RToD (Stoomwezen) and EN-13480.

In addition to stress analyses in pipe systems, Engiplast is also specialised in the analysis of GRP/GRE pipe systems according to BS7159, UKOOA and ISO14692. These analyses require extra attention for the determination of stress intensification factors, SIFs, because in many cases no standard bends and T pieces are used, as they are in a steel pipe system.

At DOW, Terneuzen, various new GRE cooling-water pipes were installed. Stress analyses were performed for these.



Determination of the stress intensification factor (SIF)



T piece of GRE, modelled in CAESAR II

Amerplastics supplied the construction of the T pieces, based on which the input method for the calculation package was determined. This way, a correct SIF and rigidity could be included in the calculation. In addition, the calculation took into account the extra forces on the pipe system as a result of water hammer.

Based on the results of the stress analysis, the locations for constructive support were adjusted where necessary, in order to meet the maximum permissible values according to BS7159.

The forces on the supports, based on the results of the analysis, were supplied by the steel constructor, who obtained a good overview of the forces on the different portals this way.

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## Stress analysis in pipe system