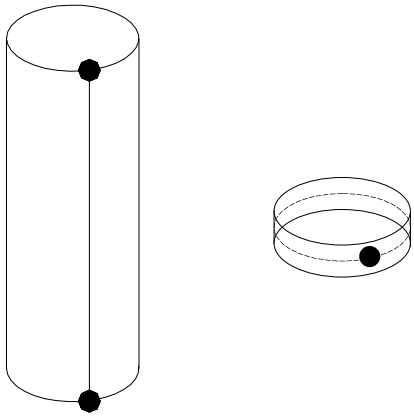
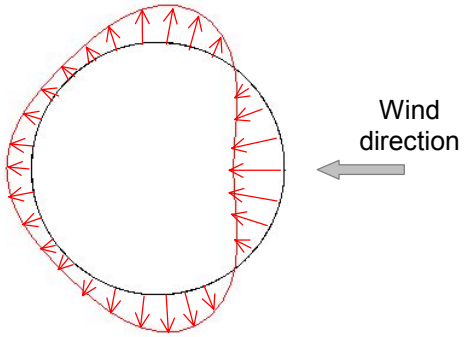
Graduation Presentation

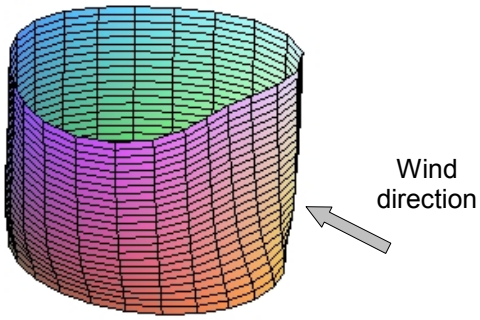
Derivation and application of circular shell elements

Classic shell theory implemented in a modern computation method

Thin circular cylinders and rings can be used to model axisymmetric shells, like chimneys and storage tanks. The behaviour of such cylinders and rings can be described by the theory of Donnell (1933) and Morley-Koiter (1959) respectively. The computation of an assembly of cylinders and rings is laborious due to the large number of equations. Therefore, the solution procedure needs to be formalised for implementation in a computer program.







In this graduation project the implementation of a circular cylindrical shell element and a ring element into the finite element method is carried out. The general solutions of the Donnell theory and the Morley-Koiter theory are used to derive the element stiffness matrix and load vector of the cylindrical element and ring element. Consequently, the elements generate the exact general solutions of both theories. Therefore, these elements are referred to as *smart*.

The elements are implemented in a small finite element program to run a number of cases. These cases include slender chimneys and stocky storage tanks subjected to a wind load. In addition, the effects of stiffening rings are studied.

Geïnteresseerden zijn van harte uitgenodigd voor de presentatie.

Student:	Carine van Bentum
Date:	Friday 7 june 2002
Time:	14.00h
Location:	Lecture room F Faculty of Civil Engineering

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