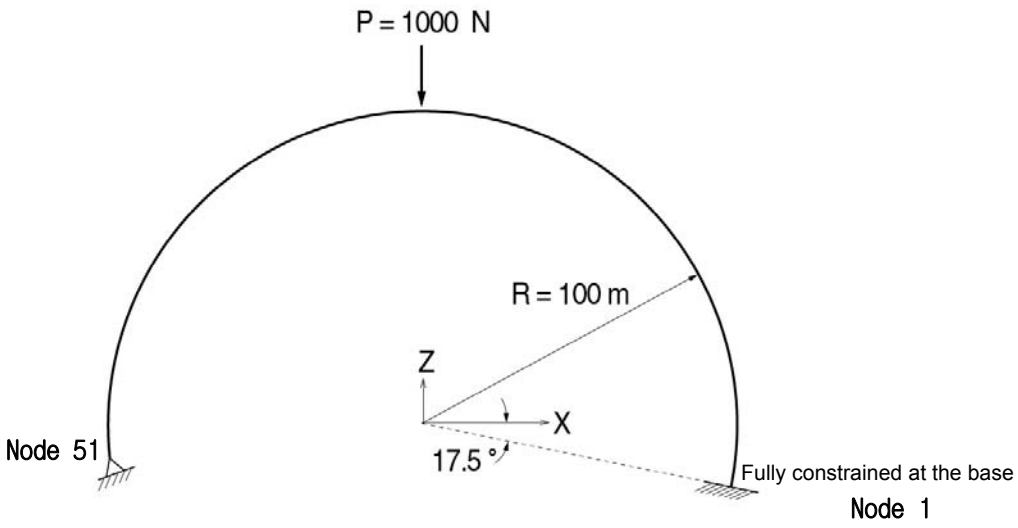
GNL-1

Title

Geometric nonlinear analysis of a high arch structure

Description

Obtain load-displacement relation curves at the point of load application on a 100 m radius, high arch structure. Carry out a geometric nonlinear analysis for the results.



Structural geometry and analysis model

Model

Analysis Type

2-D static analysis (X-Z plane)

Unit System

m, N

Dimension

100 m radius

Element

Beam element

Material

Modulus of elasticity $E = 6.0 \times 10^6$ Pa

Poisson's ratio $\nu = 0.3$

Element Property

Area $A = 1.0\ m^2$

Moment of inertia $I_{yy} = 0.16667\ m^4$

Boundary Condition

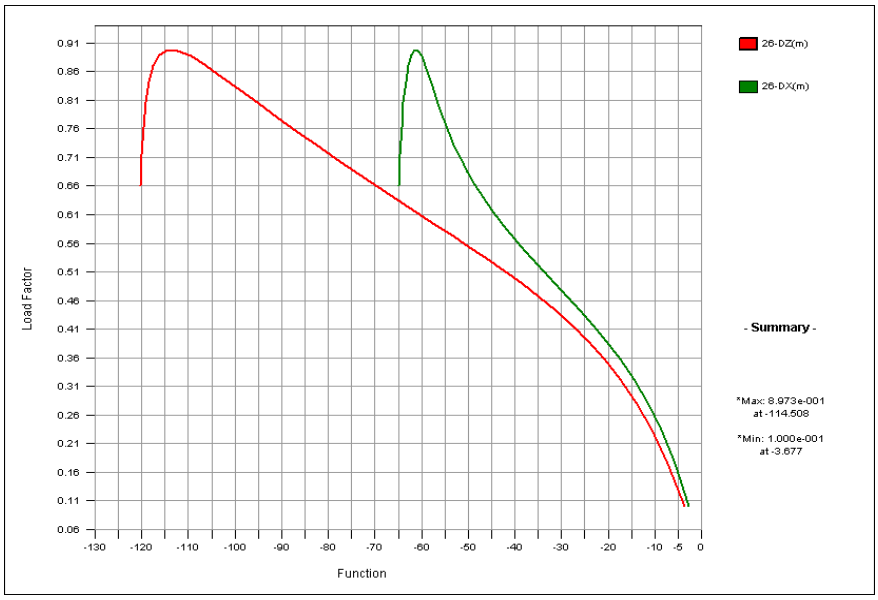
Nodes 1 : Constrain Dx, Dz. & Ry

Nodes 51 : Constrain Dx & Dz

Load Case

A concentrated load, 1000 N is applied to the node 26 in the (-)Z direction.

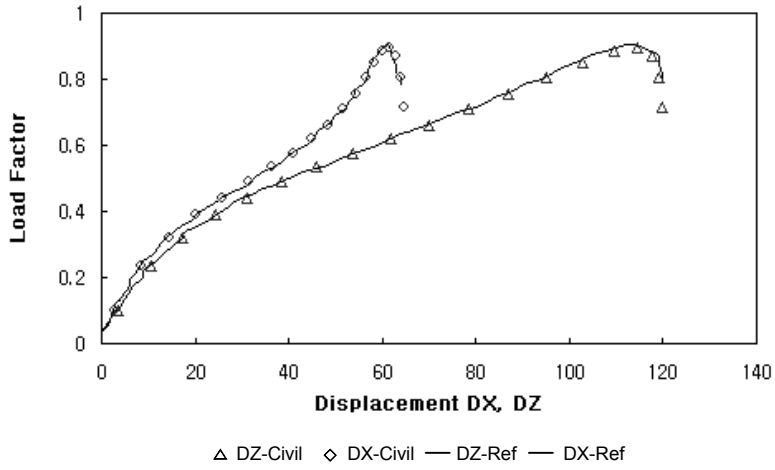
Results



Load-Displacement Curve for High Arch Structure

Comparison of Results

Load-Displacement Curve for High Arch Structure



Reference

O.C. Zienkiewicz, "*The Finite Element Method*", McGraw Hill Book Company, 1977.