

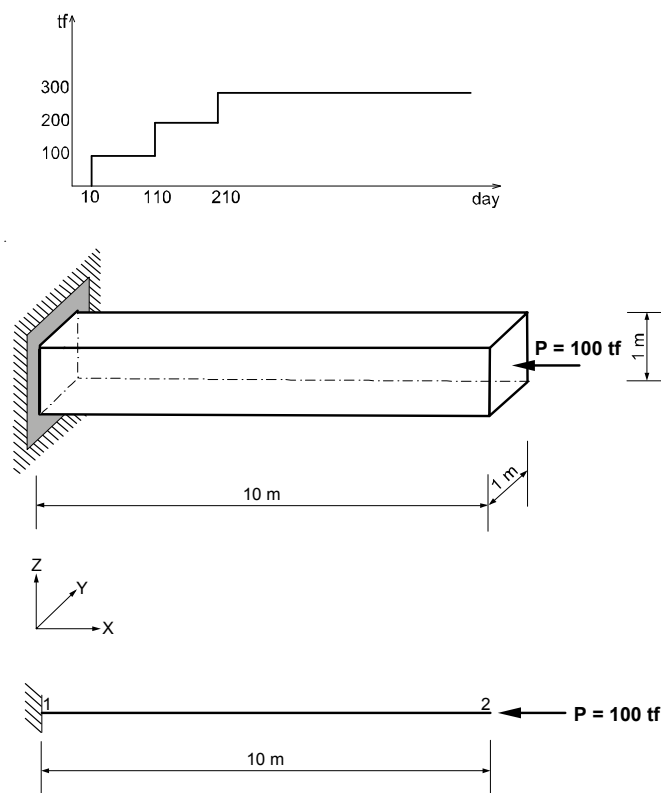
# TDM-2

## Title

Creep & shrinkage analysis of a beam

## Description

Determine the deformation by creep and shrinkage.



*Structural geometry and analysis model*

## Model

### *Analysis Type*

3-D Creep & shrinkage analysis

### *Unit System*

m, tf

### *Dimension*

Length 10 m

### *Element*

Beam element

### *Material*

Modulus of elasticity  $E = 3.63 \times 10^6 \text{ tf/m}^2$

Poisson's ratio  $\nu = 0.18$

### *Creep&shrinkage Material*

Code : CEB-FIP 1990

Compressive strength of concete at the age of 28 days 4000 tf/m<sup>2</sup>

Relative Humidity 70 %

Notational size of member 0.5

Type of cement : Normal or rapid hardening cement

Age of concrete at the beginning of shrinkage 3 day

Age of concrete at the beginning of loading 10 day

### *Section Property*

Area  $A = 1.0 \text{ m}^2$

Moment of inertia  $I_{yy} = 0.083333 \text{ m}^4$

### *Boundary Condition*

Node 1 ; Constrain all DOFs

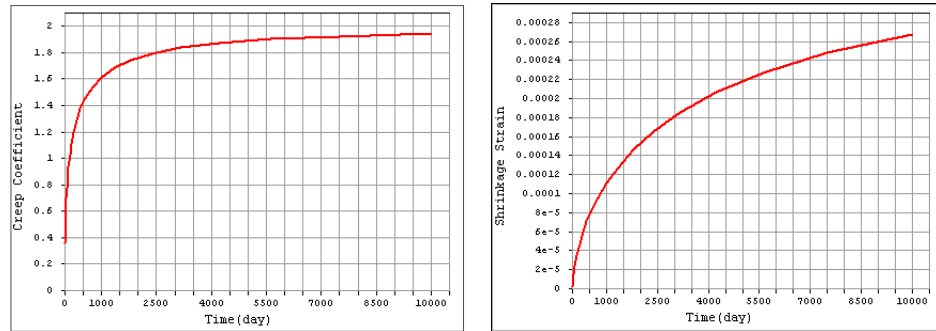
### *Load Case*

First loading(100 tf) at age 10 days

Second loading(100 tf) at age 110 days

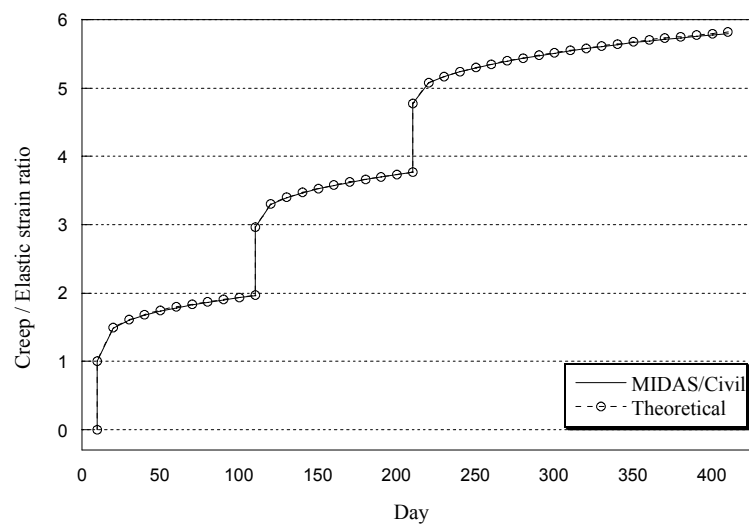
Third loading(100 tf) at age 210 days

### *Creep coefficient and shrinkage strain*

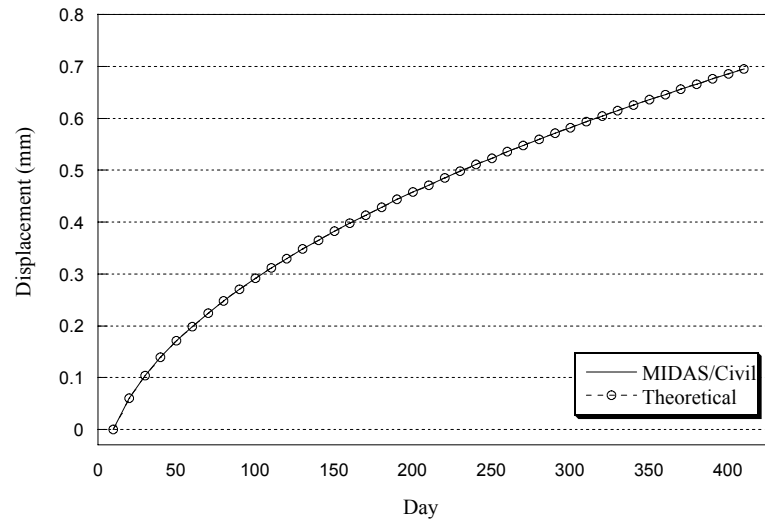


## Results

### *Creep / Elastic strain ratio*



### Displacements by shrinkage



## Comparison of Results

Unit : mm			
Results	Day	Theoretical	MIDAS/Civil
Creep / Elastic strain ratio	10	1.0000	1.0000
	110	1.9654	1.9605
	210	3.7703	3.7716
	410	5.8212	5.7994
Displacements by shrinkage	10	0.0000	0.0000
	110	0.0000	0.0000
	210	0.4711	0.4711
	410	0.6950	0.6950

## Reference

A. Ghali “Concrete Structures : Stress and Deformation Second edition”