ETC-C

EPR TECHNICAL CODE FOR CIVIL WORKS

2010 Edition

2nd Errata – July 2016

afcen

French Association for Design, Construction, and In Service
Inspection Rules for Nuclear Island Components

AFCEN – Association régie par la loi du 1er juillet 1901
Siège administratif: AFCEN, Tour Areva, 92084 Paris la Défense Cedex FRANCE
Dépôt légal N° 122-2010
ISBN N° 2-913638-32-5

NOTE TO THE USER

This document proposes modifications identified through:

- the feedback of AFCEN codes users.
- the preparation of "Traduction Française de l'Edition RCC-CW 2015".

ETC-C 2010 List of pages concerned by Errata	page 196 of 405

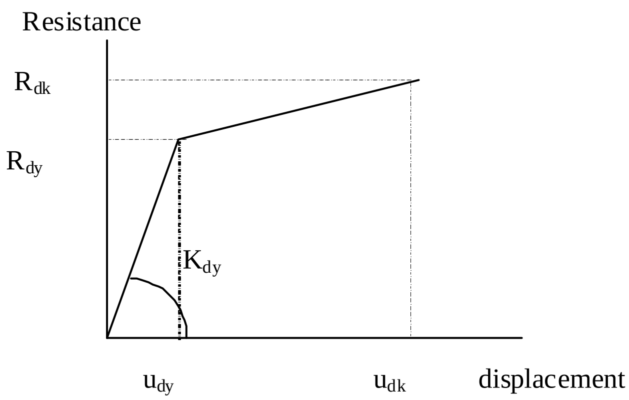

Figure 1.C-5 Displacement-resistance diagram

According to the amount of reinforcement and the concrete cross-section, the elastic bending moment M_{dy} and the cracked rigidity D ($D = E\, I_{cracked}$) are evaluated taking into account the normal force (if any) associated with the bending moment.

The ultimate plastic bending moment M_{dk} is evaluated following the design criteria concerning the allowable strains in the concrete and in the reinforcement.

The elastic displacement of the circular slab clamped at the periphery and loaded by a unit force concentrated on a circular area is given by:

Equation 1.C-16

$$\frac{1}{K_{dy}} = w = \frac{a^2}{64\pi \cdot D} \cdot \left[\left(4 - 3 \cdot \gamma^2\right) + 4 \cdot \gamma^2 \cdot \ln \gamma\right]$$

With:

- $\gamma = a / r$;
- υ: the Poisson' ratio is taken as equal to 0.

The elastic resistance R_{dy} of the slab is calculated according to the formula of a circular slab clamped at the periphery and loaded by a unit force concentrated on a circular area:

Equation 1.C-17

$$R_{dy} = \frac{16\pi \cdot M_{dy}}{(1+\upsilon) \cdot \left[\gamma^2 - 4 \ln \gamma\right]}$$

The maximum elastic displacement of the slab is given by:

Equation 1.C-18

$$u_{dy} = \frac{a^2 \cdot M_{dy}}{4 \cdot D} \cdot \frac{\left[\left(4 - 3 \cdot \gamma^2\right) + 4 \cdot \gamma^2 \cdot \ln \gamma\right]}{(1+\upsilon) \cdot \left(\gamma^2 - 4 \cdot \ln \gamma\right)}$$