

Creep

Creep behavior is associated with time-dependent, stress-induced changes in the strain and deformation of a structural member. Creep, along with [shrinkage](#) (decrease in direct strains over time) and aging (change in elastic modulus with age), are time-dependent material behaviors which may be applied to concrete objects using [staged-construction](#) analysis. Staged construction is a [nonlinear-static](#) application available to CSI Software with [Ultimate](#) Level. Additional information may be found in the [CSI Analysis Reference Manual](#) (Staged Construction, page 396). Staged construction is also necessary for modeling creep, shrinkage, and relaxation within [tendons](#). Tendon elastic shortening, however, is automatically implemented with any software package.

Each of these time-dependent behaviors are specified according to CEB-FIP parameters (Comite Euro-International Du Beton, 1993). Creep formulation may follow full integration or an expedited Dirichlet series approximation (Ketchum, 1986). The [CSI Analysis Reference Manual](#) (Time-dependent Properties, page 85) presents further details.

Related Content

Articles

Tutorials

- [Time dependent properties first steps \(SAP2000\)](#)

Test Problems

- [Staged construction in buildings](#)
- [Staged construction of a five-story column](#)

See Also

- Verification Example 16, available through Help > Documentation
- [Shrinkage](#) section

References

- Ghali, A., Favre, R., Elbadry, M. (2002). [Concrete Structures: Stresses and Deformations: Analysis and Design for Serviceability](#) (3rd ed.). London, England: Spon Press.
- [SEGAN: Analysis of curved segmentally-erected prestressed-concrete box-girder bridges](#) (website), legacy software from Earthquake Engineering Online Archive - computational code for creep implementation