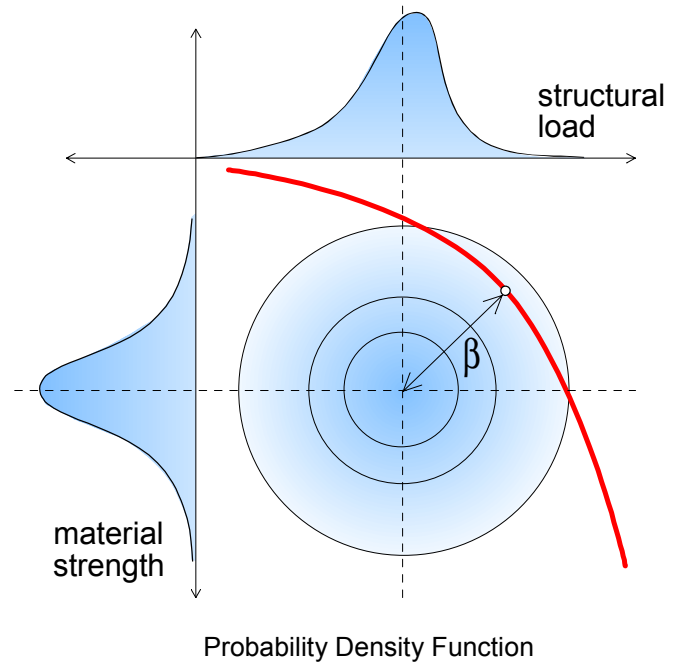# Computation of Safety Factors

**Master of Science Project**

Safety factors for structural load and material strength are available in codes of practice for designing structural dimensions. These factors take into account uncertainties in future loading, future strength and also uncertainties in model accuracy

According to the theory of reliability these factors can be calibrated to some safety target taking into account the variability of the loads and resistances as well as their importance in the mechanism under consideration. At ETH Zurich a computer program has been developed to make such a calibration and in this graduation project we want to apply this method to a number of structures (buildings, bridges) of different materials (concrete, steel, timber).The result will be a set of partial factors, preferably to be used in the so called Dutch National Annex of the Eurocode CEN 1990, Basis of structural Design



structural load

material strength

$\beta$

Probability Density Function



Akashi Kaikyo Bridge, Kobe, Japan
Suspension Bridge, Largest in the World

The project consists of the following stages

1) study reliability theory in relation to the derivation of partial factors and load combinations.
2) study the ETH computer program mentioned above.
3) compute safety factors for a set of common bridges and buildings.
4) compute safety factors for one or two exceptional structures.
5) compare the results with simple manual estimates.
6) compare the results with present Dutch codes of practice.

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|---|---|
| Datum: 1 July 2002 | Afstudeerhoogleraar: prof.ir.A.C.W.M. Vrouwenvelder |
| | Begeleider: dr.ir.P.C.J. Hoogenboom (CT 5.24) |
| | Externe begeleider: |
| | Afstudeercoördinator: ir.J.M.J. Spijkers |