Reliability of structures

Lecturer: Professor ANDRZEJ S. NOWAK (Auburn University, USA)

Course description:

The objective of this course is to develop understanding of the reliability-based methods of structural analysis. The course covers the review of fundamentals of theory of probability and statistics, reliability analysis methods, development of design codes, probability-based models of load and resistance, applications of reliability analysis to structural members and structural systems and effect of human errors on structural reliability. The course is offered primarily for graduate students. The pre-requisite is a basic knowledge of structural design, including reinforced concrete, prestressed concrete and steel structures.

Syllabus of the lecture

Lecture Session 1
- Uncertainty in structural engineering
- Random variables
- Properties of a random variable

Lecture Session 2
- Normal random variable
- Probability paper
- Other distributions, joint distributions

Lecture Session 3
- Functions of a random variable
- Monte Carlo method
- Limit state function, Reliability index

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Lecture Session 4

• Second Moment reliability index
• Hasofer-Lind reliability index
• Rackwitz-Fiessler procedure
• Reliability by Monte Carlo

Lecture Session 5

• Code development
• Load models; dead load, live load
• Other load components

Lecture Session 6

• Load combinations
• Resistance models; steel
• Resistance models; concrete, wood

Lecture Session 7

• Structural systems; brittle and ductile elements
• Systems with partially correlated elements
• System reliability analysis - examples

Lecture Session 8

• Reliability-based calibration
• Code development procedures, ACI 318
• Code development procedures, LRFD AASHTO
• Bayesian methods
• Human errors, sensitivity analysis.

TERMINY WYKLADÓW			
Data	**Dzień tygodnia**	**Godzina**	**Sala**
2014-05-05	Poniedziałek	13.15-18	Sala 5 żelbet
2014-05-06	Wtorek	13.15-18	Sala 5 żelbet
2014-05-07	Środa	10.15-15.00	Sala 5 żelbet