

HKIAS Distinguished Lecture Series

A Theoretical Background For Ultimate Limit State Design

Professor Jean Salençon

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HKIAS Senior Fellow



Date: 9 March 2026 (Monday)

Time: 4:00pm-5:00pm (Light refreshment will be served from 3:30pm-4:00pm)

Venue: Interdisciplinary Multi-function Room (AE-040), LG/F,
Academic Exchange Building, City University of Hong Kong

Abstract Since the 1990s, Ultimate Limit State Design (ULSD) has gradually been used as a reference for safety analyses and design in civil and construction engineering, as illustrated, for instance, by its being used as a basis for the elaboration of the Eurocodes. Following Krebs Ovesen's General Report (1989), the philosophy of ULSD can be described in the form of a symbolic inequality, which states that the value of the design load effect on equilibrium shall remain inferior to the value of the design resistance effect. For practical applications to stability analysis and design, this inequality must first be explicated and then quantified. Both issues can be addressed by referring to the Yield Design Theory. The concept of an auxiliary structure is introduced, which is geometrically identical to the original one, subjected to design loads and whose constituent material is characterized by design resistance parameters, these design values being derived from the original ones using appropriate partial safety coefficients. Then, the fundamental assumption at the very root of ULSD is that the potential stability of this auxiliary structure, as defined by the yield design theory, implies that the design of the original structure is safe. These considerations are illustrated on a classical Soil mechanics problem. Attention is drawn onto the fact that the reliability of this approach is dependent on the reliability of the resistance criteria it refers to, together with the assessment of the validity of the fundamental assumption in view of the specificities of the problem at hand.

Biography Professor Jean Salençon, an Honorary Professor at École Polytechnique and École nationale des ponts et chaussées in France, is a distinguished figure in the field of Continuum Mechanics. He also held the positions of Chair Professor-at-Large and Visiting Distinguished Professor at the City University of Hong Kong (CityU) from 2011 to 2016. He is currently a Senior Fellow of the Hong Kong Institute for Advanced Study at CityU. During his illustrious career, he served as the President of the French Academy of Sciences in 2009 and 2010 and presided over the Institut de France in 2009. Professor Salençon is a Member of the Academia Europaea, and holds foreign memberships in the Istituto Lombardo (Milan) and the Academia das Ciências de Lisboa (Portugal). He is also an Honorary Member of the Hungarian Academy of Sciences and a Corresponding Member of the Académie des sciences et lettres de Montpellier (France). With a vast body of work that includes over 200 publications, 20 books, textbooks, and 15 multimedia software, Professor Jean Salençon is a renowned global leader in the field of Continuum Mechanics, contributing significantly to both theory and its practical applications.

Supported in part by: 光華教育基金會 Kwang Hua Educational Foundation

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