

Planning for climate change and rapid Urbanisation

Continuing Professional Development, Lecture Series for Professionals

lecture notes

- Lecture title : Resilient Infrastructure
- Presenter : Ian Carradice
- Presenter firm : Arup
- WWW : www.arup.com

summary

In this lecture, Ian Carradice from Arup will outline the principles of resilient infrastructure design, the role of planetary solutions and its importance to the development of cities which are both sustainable and resilient. Drawing on a case study of a planned city extension in Muscat, Oman, Ian will illustrate the many benefits to be achieved and the value to be added by adopting a more systematic, integrated design approach that also minimises cost and carbon emissions.

learning outcomes

By the end of this lecture, students will:

- Understand the context, relevance and drivers to design and develop resilient infrastructure.
- Recognise the role of infrastructure systems in cities and comprehend how an integrated design approach can generate positive impacts, prevent failure, expedite recovery and transform performance.
- Frame resilience in the context of planetary boundaries and identify how infrastructure addresses the climate emergency not only in cities, but in agriculture, food production, land management, and oceans.
- Understand how to bring theory to practice by learning the strategic moves undertaken in the Irfan infrastructure masterplan to maximise value of the site and sustainability of the development.

speaker notes (to be read in conjunction with the presentation)

- Slide 1 : Introduction
- Slides 2-5 : Resilience context, challenges and hazards
- Slides 6-9 : International guidance and agreements (Planetary Boundaries, UNSDGs, COP21, etc)
- Slides 10-14 : Definitions (sustainable development, resilience, net zero carbon)
- Slides 15-18 : Existing risk and resilience assessments
- Slides 19-22 : Context for designing for sustainability and resilience
- Slides 23-36 : Systems with control during masterplanning (urban design, existing and new buildings, landscape, earthworks, transport, water supply, foul drainage, surface water drainage, energy, solid waste, ICT, and lighting)
- Slides 37-38 : Land management and agriculture: carbon sequestration
- Slides 39-44 : Food production, land-use management, natural farming, urban farming
- Slides 45-46 : Oceans and Seas: carbon pump and marine ecosystem restoration; and
- Slides 47-68 : Irfan as a city-scale example

key concepts

Resilience, Hazards, Planetary Boundaries, Climate Change, Sustainability, Water, Energy, Transport, Landscape, Circular Economy, Governance, Integrated design, Food Production.

links to further information

[City Resilience Index](#), [City Water Resilience Approach](#), [Future Cities: Building Infrastructure Resilience](#), [Resilience for Infrastructure](#), [Planetary Boundaries](#), [LETI Climate Emergency Design Guide](#), [Resilience Shift](#).

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