
Sustainability through Disaster Risk Reduction

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9.1 Introduction

A single disaster can deal a blow to life, livelihood, assets, and the fabric of society from which it can take decades to recover. It can undo improvements in sustainable living gained over many years and indeed set a community as large as a state back behind the starting point of its major developments. The challenge for the structural engineer is to design and build structures and infrastructure such that, in conjunction with other measures of building community resilience, the risk of disaster is minimized.

An early definition of sustainable development is given in Ref. [1]: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

By substituting “structures and infrastructure” for “development”, one arrives at a definition suitable for an engineer. However, this substitution makes it clear that the engineer’s contribution to sustainability through disasters is just one component of a multidisciplinary approach.

This chapter addresses disasters arising from natural hazards. Disasters arising from human conflict are excluded, although these outweigh those due to natural hazards. We speak of natural disasters, but in reality, natural disasters are man-made. Natural hazards occur only when they overwhelm human communities, which are unprepared for the natural hazard and lack the necessary resilience to reduce the impact to a manageable level.

9.2 The triple bottom line

A valuable enhancement to the concept of sustainability was made in 2006 [2]. While the initial concept focused on ecological issues—environmental degradation and dangerous depletion of resources—in conflict with economic growth, the new concept saw sustainability as the