HOW TO EVALUATE SUSTAINABLE SOLUTIONS FOR POST DISASTER BUILDINGS

Fatma Seyma Keskin

Prof. Charalampos Baniotopoulos & Dr. Pedro Martinez-Vazquez
Department of Civil Engineering, University of Birmingham, Birmingham, UK

2 Major Problems

Buildings with the biggest responsible of the pollution + Numerous buildings damaged by disasters

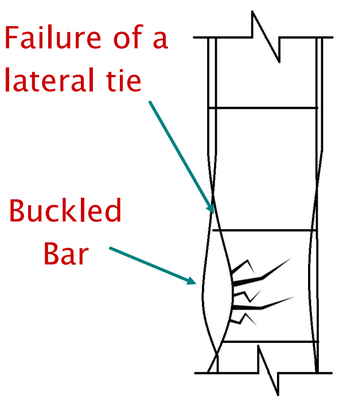
1 Solution

Besides the structural strengthening of damaged building, taking into account its environmental, social and cost impacts.

The Numbers of Damaged or Destroyed Buildings[1]

Turkey, 1999.	Haiti, 2016.	Indonesia, 2004.	US, 2011.
154,000	200,000	200,000	1,800
Japan, 2011.	US, 2005.	Pakistan, 2010.	Australia, 2009.
370,000	275,000	1,600,000	2,050
Nepal, 2015.	Philippines, 2013.		US, 2003.
900,000	1,080,000		3,650

HOW TO MAKE EARTHQUAKE-DAMAGED BUILDING SAFER

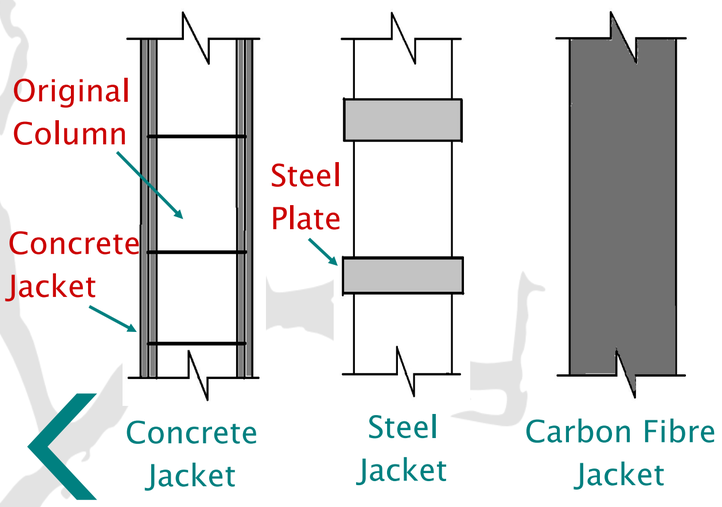


Damaged on structural concrete

Strengthening of buildings includes:

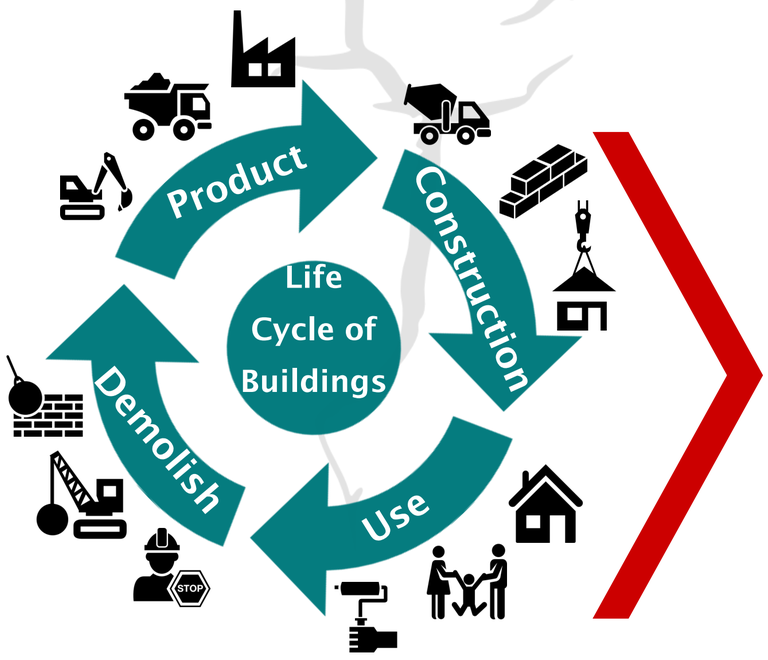
- Strengthening of existing elements
- Addition of new elements,
- Continuity of force transfer.

3 strengthening options for earthquake damages



HOW TO CONTINUE THE SUSTAINABILITY CRITERIA AFTER DISASTER

Life Cycle Assessment methodology is chosen to achieve sustainable strengthening design.



Life Cycle Impacts of the Strengthening Options

Environmental	Social	Cost
• Natural resource depletion	• Architectural quality and aesthetics	• Raw materials, transformation process
• Energy and water consumption	• Time and noise	• Mechanical equipment
• Emissions	• Health and safety of users	• Repair, demolition and waste
	• User satisfaction	

The **target** post-disaster building of the study is:

Safe + Environmentally friendly + Socially Responsible + Economic

Conclusion

This integrated approach can be adopted for many buildings damaged from various kinds of disasters when choosing the best structural strengthening option in accordance with sustainability.

Reference: *World Disaster Report 2016. Resilience: saving lives today, investing tomorrow*
http://www.ifrc.org/Global/Documents/Secretariat/201610/WDR%202016-FINAL_web.pdf Accessed 02.06.2018

Fatma Seyma Keskin - FSK602@bham.ac.uk