HOW TO EVALUATE SUSTAINABLE SOLUTIONS FOR POST DISASTER BUILDINGS

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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.

3 strengthening options for earthquake damages

The Numbers of Damaged or Destroyed Buildings[1]

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
<td>1999</td>
<td>154,000</td>
</tr>
<tr>
<td>Japan</td>
<td>2011</td>
<td>370,000</td>
</tr>
<tr>
<td>Nepal</td>
<td>2015</td>
<td>900,000</td>
</tr>
<tr>
<td>Haiti</td>
<td>2016</td>
<td>200,000</td>
</tr>
<tr>
<td>US</td>
<td>2004</td>
<td>200,000</td>
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<tr>
<td>Pakistan</td>
<td>2010</td>
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<tr>
<td>Indonesia</td>
<td>2004</td>
<td>200,000</td>
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<tr>
<td>Haiti</td>
<td>2016</td>
<td>200,000</td>
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<tr>
<td>Philippines</td>
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<tr>
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<td>Australia</td>
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<td>US</td>
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HOW TO MAKE EARTHQUAKE-DAMAGED BUILDING SAFER

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

Original Column
Concrete Jacket
Steel Plate
Concrete Jacket
Steel Jacket
Carbon Fibre Jacket

HOW TO CONTINUE THE SUSTAINABILITY CRITERIA AFTER DISASTER

Life Cycle Impacts of the Strengthening Options

Environmental
- Natural resource depletion
- Energy and water consumption
- Emissions

Social
- Architectural quality and aesthetics
- Time and noise
- Health and safety of users
- User satisfaction

Cost
- Raw materials, transformation process
- Mechanical equipment
- Repair, demolition and waste

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.