Assessment of Damages Caused to Structures due to October 8th, 2005 Kashmir Earthquake, Pakistan

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DAMAGES CAUSED TO REINFORCED CONCRETE STRUCTURES
In-Sufficient Confinement in Columns

No Lateral Ties

NESPAK

EERI
Shear Failure in Columns

Weak Column/Detailing Deficiency

NESPAK

NESPAK
Weak Connections

Insufficient anchorage for both beam and column

EEFIT
Soft Storey Failure

Permanent Deformation/Bad Design

NESPAC

EEFIT
Hospital Building

Shear Cracking in the In-fill Panels

ERRA
Soft Storey Failure
(Hospital Building)

ERRA
Concrete Cover Spalling

Hook embedded in core concrete with 135-degree hook

JSCE, AIJ
Beam-Column Joint Failure

APP
90-Degree Hook provided
Instead of 135 Degree hook

Structural Drawing Showing
135 Degree Hooks for Ties

JSCE, AIJ
Collapse due to Beam-Column Failure

ERRA
Detailing Problems

JSCE, AIJ
Beam Re-Bars Terminated at Column Surface

Re-Bar Buckling

Non-Ductile Fracture of Bar

JSCE, AIJ

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Construction Innovation Group
Collapse of an Under Construction Structure because of Lateral Resistance Deficiency

ERRA
Failure of Column due to In-fill

EERI

NWFP, UET
Cracks in the In-fill Panels

ERRA
Damage caused due to Weak Joints of RC frame structures and Irregular Configuration

NESPAK
Sub-Standard Material and Detailing Deficiencies

ERRA
Bar Pullout Failure at Joint

Wide Ties Spacing

ERRA
Wide Ties Spacing

Shear Failure in Columns

ERRA
Short Column Re-bar Buckling

Brittle Failure of Columns from Joint

ERRA
Excessive Drift Causes Concrete Cover Spalling at Connections

EFFIT
Minor Damages Caused to RC buildings
Shear Cracking In Bridge Girder

Displaced Bridge Deck
Displaced Bridge Deck

Spalling
EERI
Concrete Cover Spalling at Bridge Abutments

NWFP, UET
Various Connection Damages & Failures

EEFIT

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Insufficient Lap Splices Length

NWFP, UET
Segregation of Concrete

NWFP, UET
MISCELLANEOUS DAMAGES
ERRA
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