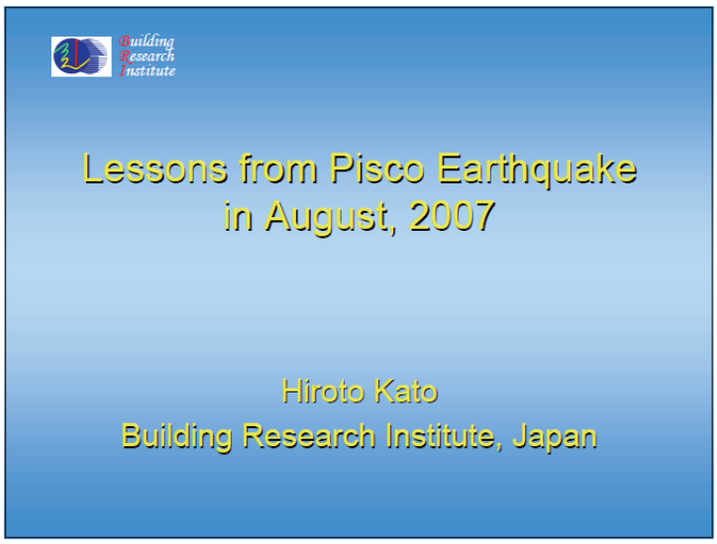
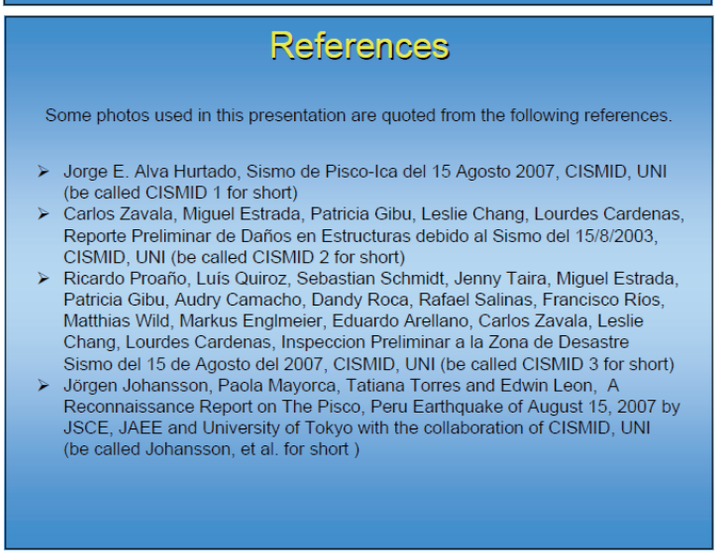
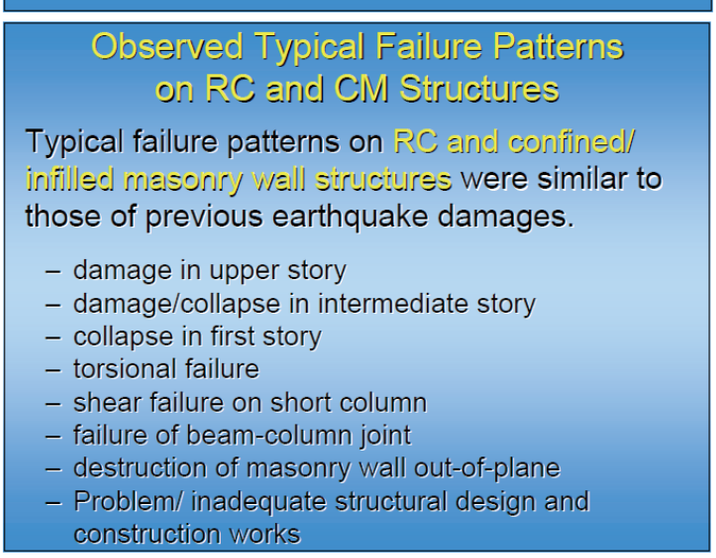
2.8. Lessons from Pisco Earthquake in August, 2007　（HIroto KATO）

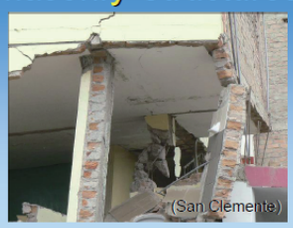
ペルー太平洋岸地震の教訓 （加藤博人）







Damage of Confined Masonry Structures

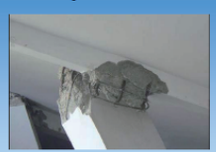


from Johansson, et al.

damage in intermediate story

from CISMID 1

Damage of Confined Masonry Structures



Close-up View of beam-column joint

Back View

Front View

Destroyed building due to the torsional vibration
by eccentricity of stiffness (Pisco)

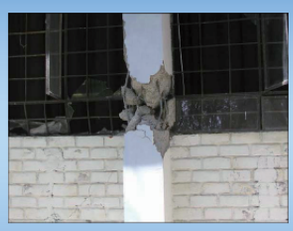
from Johansson, et al.

Damage of Confined Masonry Structures

Columns in the 1st floor are not aligned with the columns in the 2nd floor. One of the columns is interrupted in the 2nd floor. (Molinos, Ica)

from Johansson, et al.

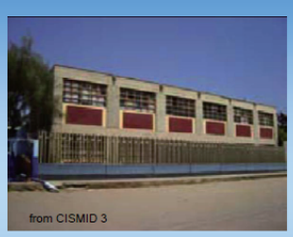
Damage of RC Frame Structure with Infilled Masonry Wall



shear failure of short column with spandrel wall

from Johansson, et al.

Confined Masonry and RC Structures



no damage

no damage
New RC building with proper size of column and beam, in addition structural slit between column and spandrel wall

These examples prove the validity of the current design regulations.

- NTE E.030 Seismic design code (latest revision 2003)
- NTE.E.060 Reinforced concrete (latest revision 1989)
- NTE.E.070 Masonry (latest revision 2006)

Observed Typical Failure Patterns on Adobe Constructions

- complete collapse
  weak materials, without reinforcement and flexible slab/roof, etc.
- out-of-plane destruction of masonry wall
  without reinforcement, insufficient connection to column
- to build an inadequate extension

Damage of Adobe Structures

(Pisco)

(Pisco Pueblo)

(Chincha)

(Ica)

from CISMID 1

Damage of Adobe Structures

Adobe house with plaster spalling and corner destruction (San Luis, Canete)

Collapsed adobe house (Nuevo Monterrico, Canete)

from Johansson, et al.

Subjects for Earthquake Disaster Mitigation

- ✓ Seismic Evaluation for Existing Buildings
- ✓ Seismic Rehabilitation/Retrofit of Vulnerable Buildings
- ✓ Education to Citizens
- ✓ Disseminate the knowledge of disaster prevention to large earthquakes
- ✓ Awareness of earthquake disasters to citizen