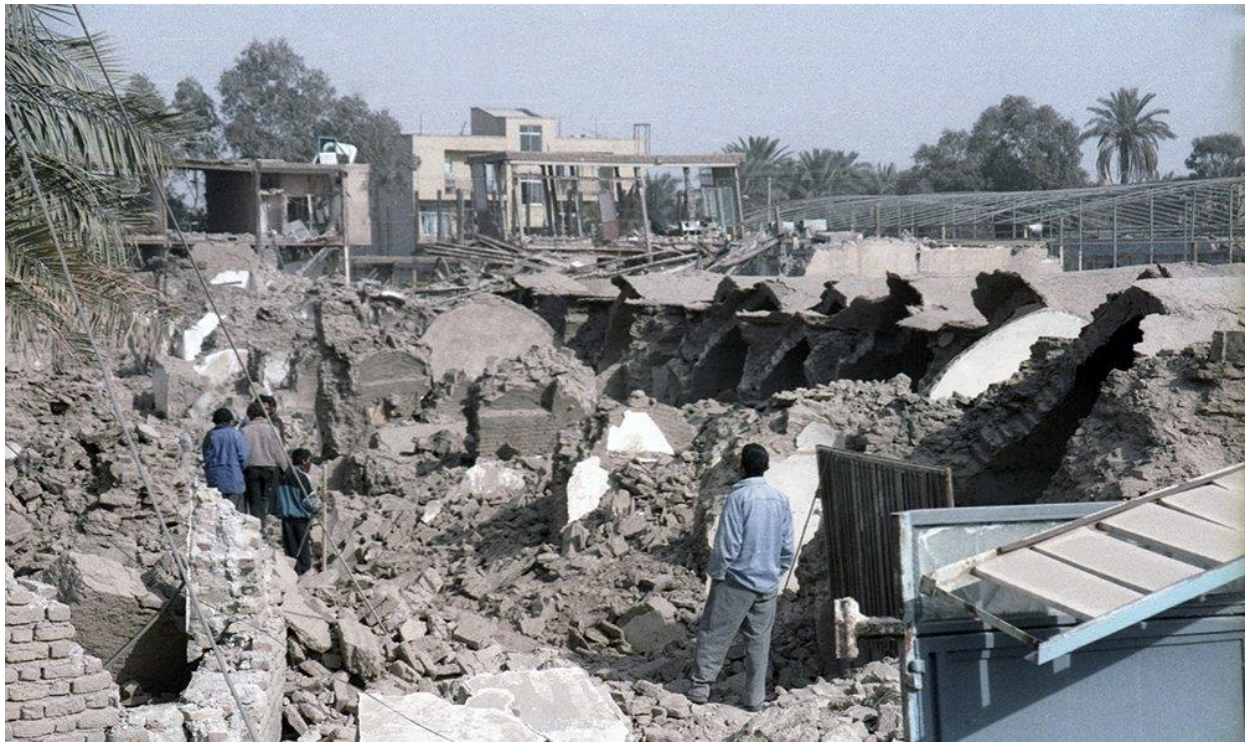
Review and analysis of some of the devastation caused by the earthquake Case Study of Bam Earthquake 2003

Damage occurred in buildings with steel structure

Bam earthquake

The 2003 **Bam earthquake** struck the Kerman province of southeastern Iran at 01:56 UTC (5:26 AM Iran Standard Time) on December 26. The shock had a moment magnitude of 6.6 and a maximum Mercalli intensity of IX (Violent). ... The **earthquake** had a psychological impact on many of the victims for years afterwards.

UTC time	2003-12-26 01:56:52
ISC event	7217667
USGS-ANSS	ComCat
Local date	December 26, 2003
Local time	05:26 Iran Standard Time
Magnitude	6.6 M_w[1]
Depth	15 km (9.3 mi)[1]
Epicenter	28.85°N 58.25°E[1]
Type	Strike-slip
Areas affected	Iran
Max. intensity	IX (*Violent*)[2]
Peak acceleration	0.98*g*[2]
Casualties	26,271 killed[3] 22,628–30,000 injured[4] 45,000–75,600 displaced[4]



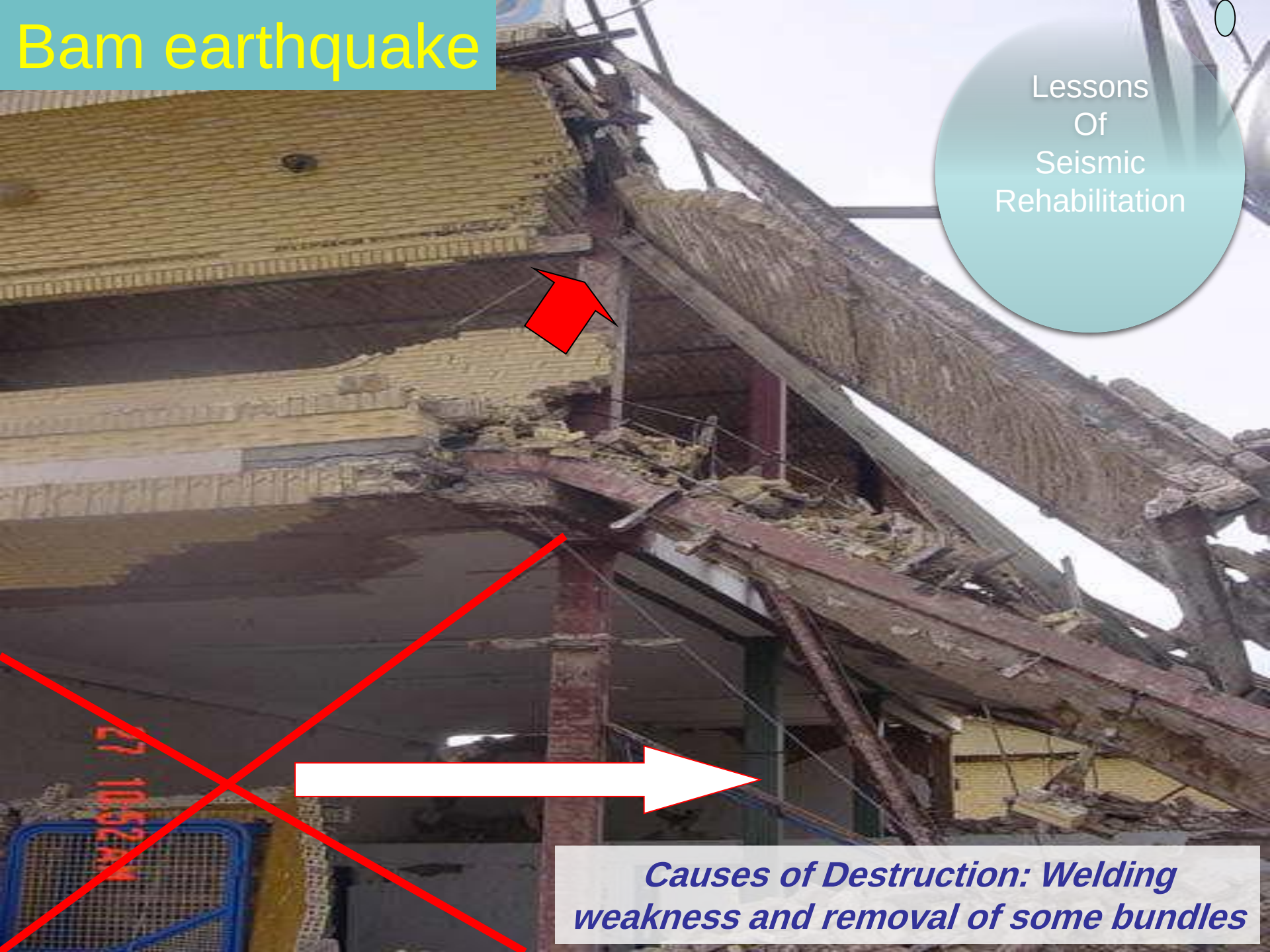
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of destruction
1) No correct welding
2- Remove the folds of the straps
3. Weakness of consumable steels
4- Problems with connections
5. Failure to properly connect the blades to the columns
6. Remove outer columns
7. Lack of awareness of executives, contractors and supervisors

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: Welding weakness and removal of some bundles

Bam earthquake

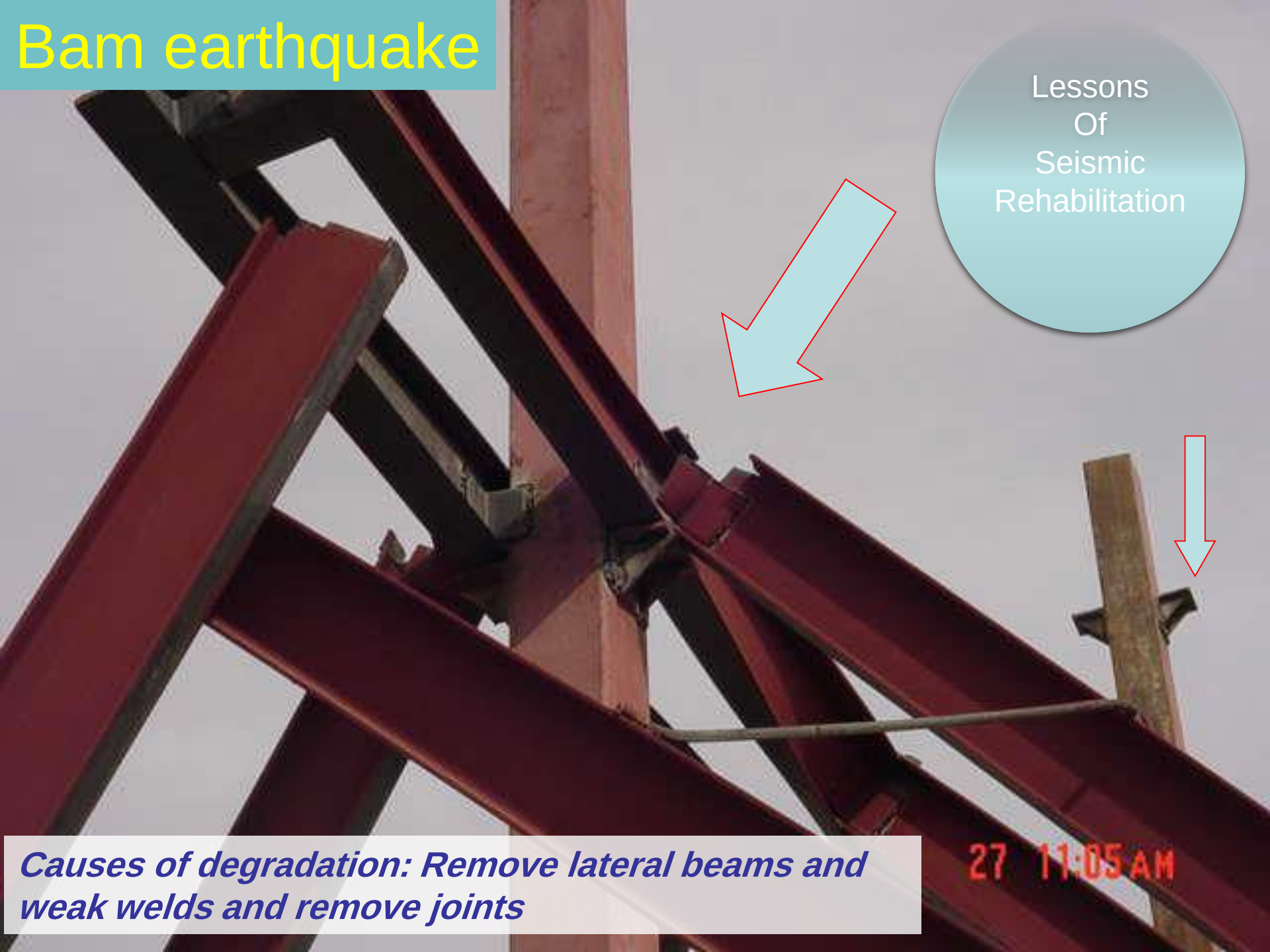
Causes of Destruction: Removing collar straps and weakness of the base and weakness of the welding

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of degradation: Remove lateral beams and weak welds

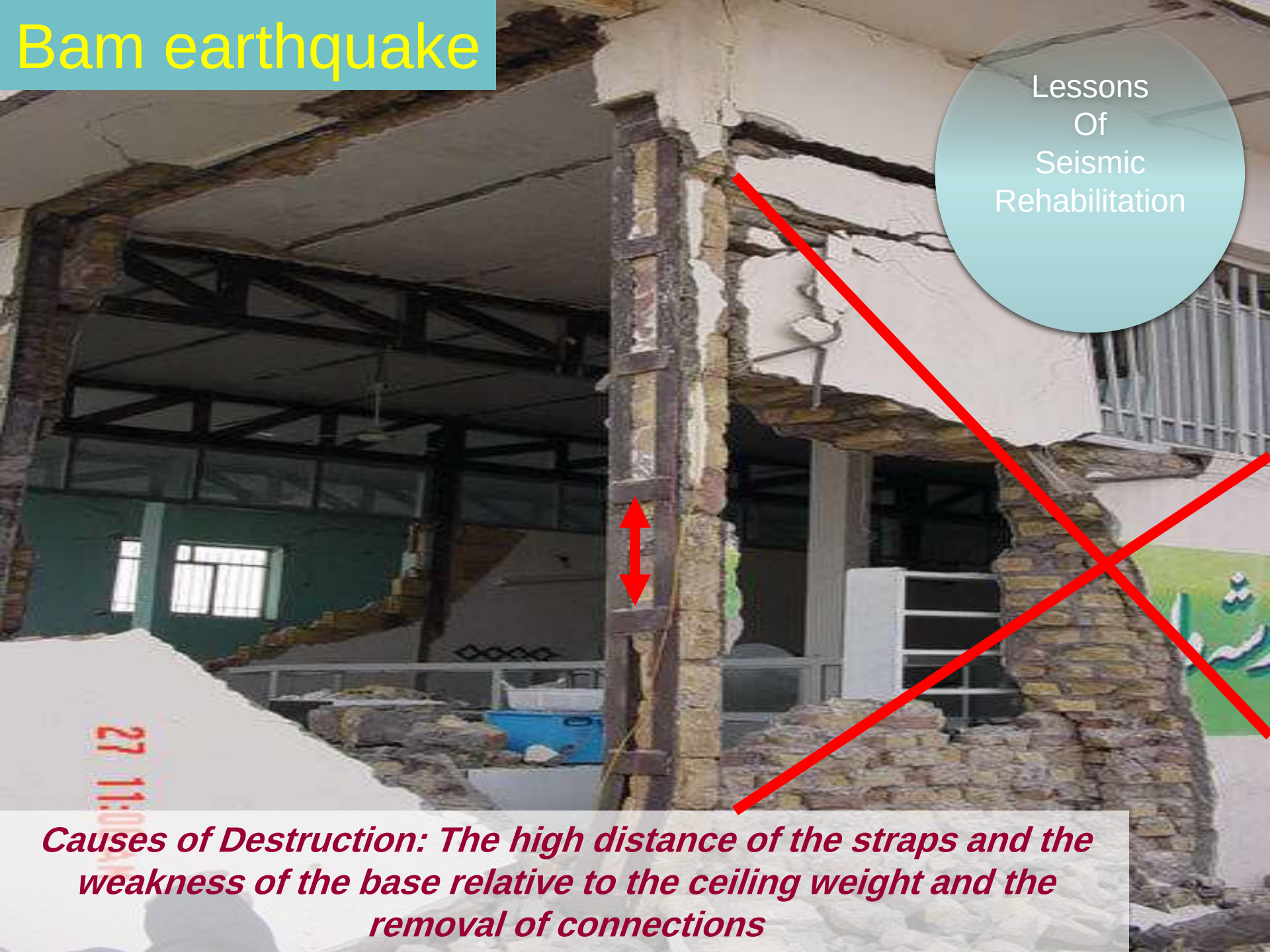
Bam earthquake



Causes of degradation: Remove lateral beams and weak welds and remove joints

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: The high distance of the straps and the weakness of the base relative to the ceiling weight and the removal of connections

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Degradation: Remove the side columns and implement the load cell wall instead and remove the joints

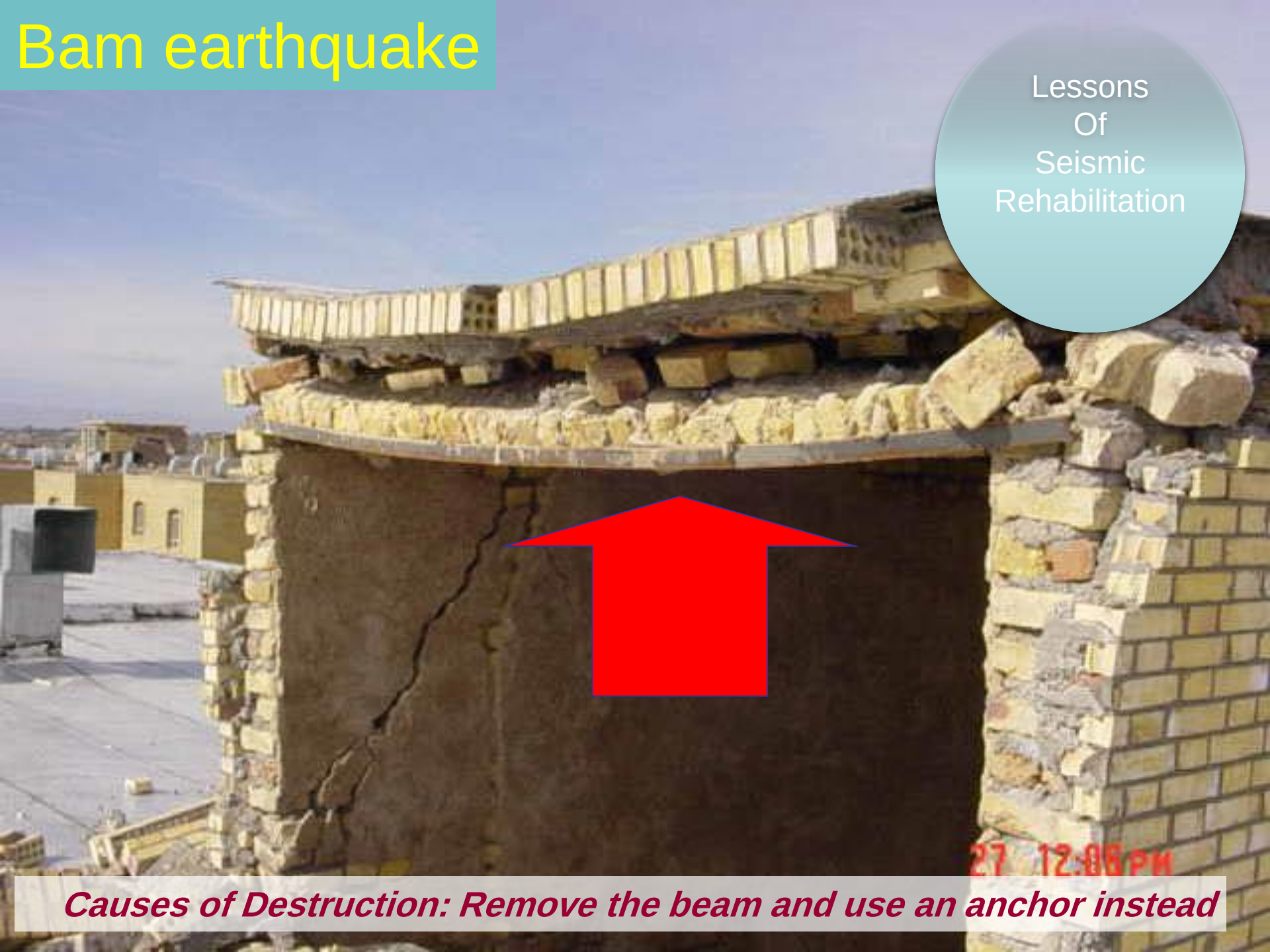
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Remove the iron bars on the opening and use a rubber instead

Bam earthquake

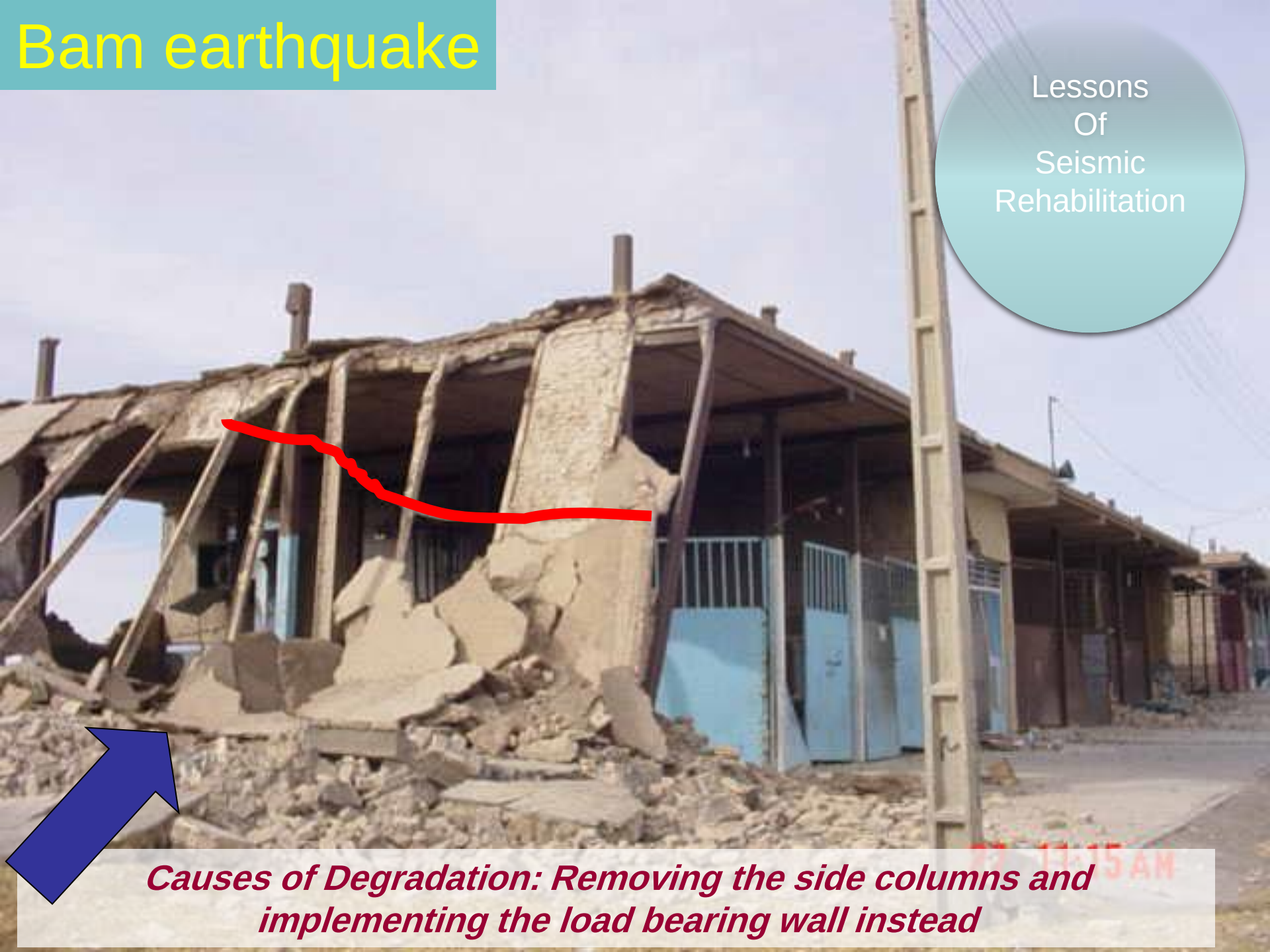
Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: Remove the beam and use an anchor instead

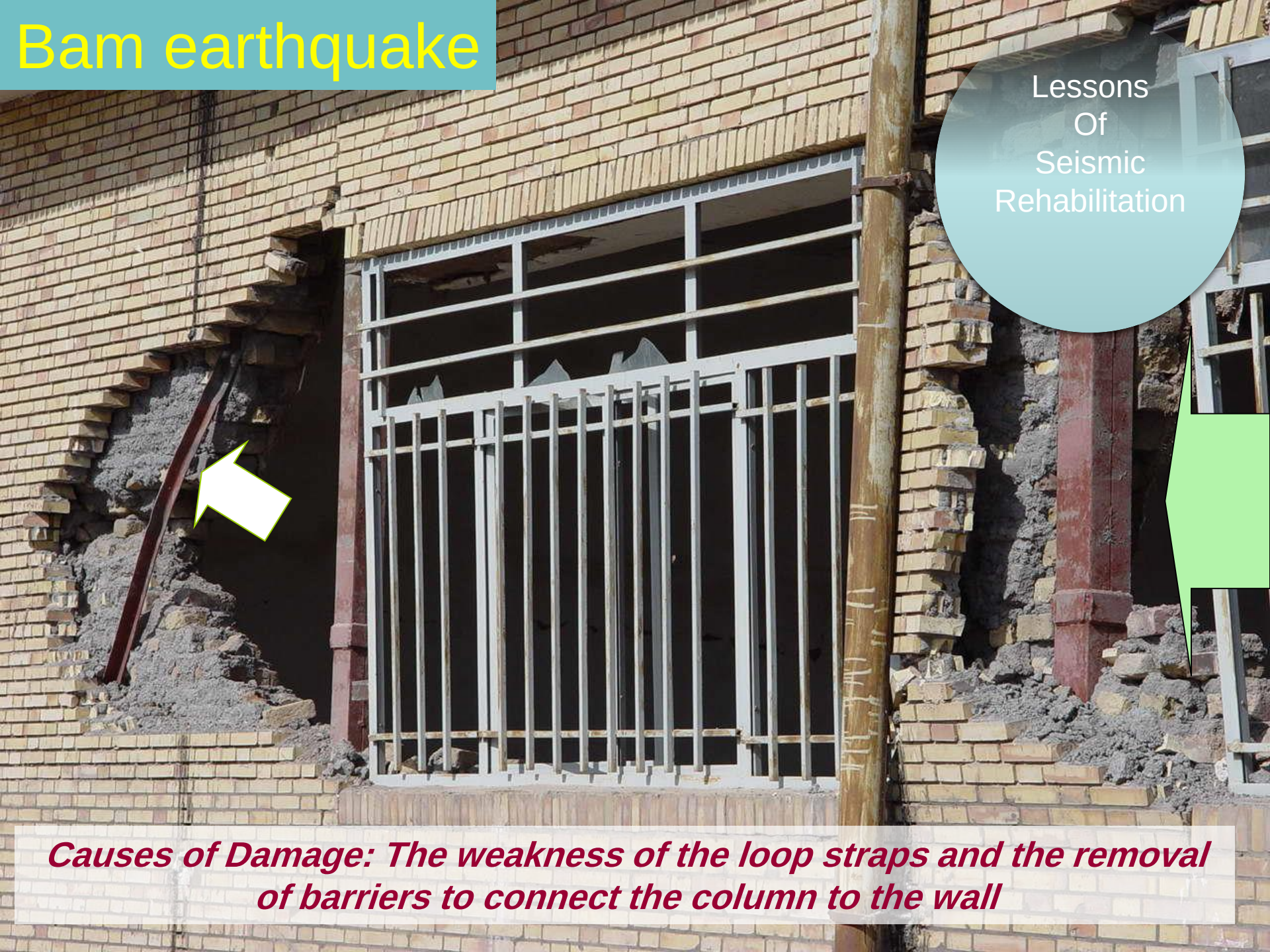
Bam earthquake

Lessons
Of
Seismic
Rehabilitation



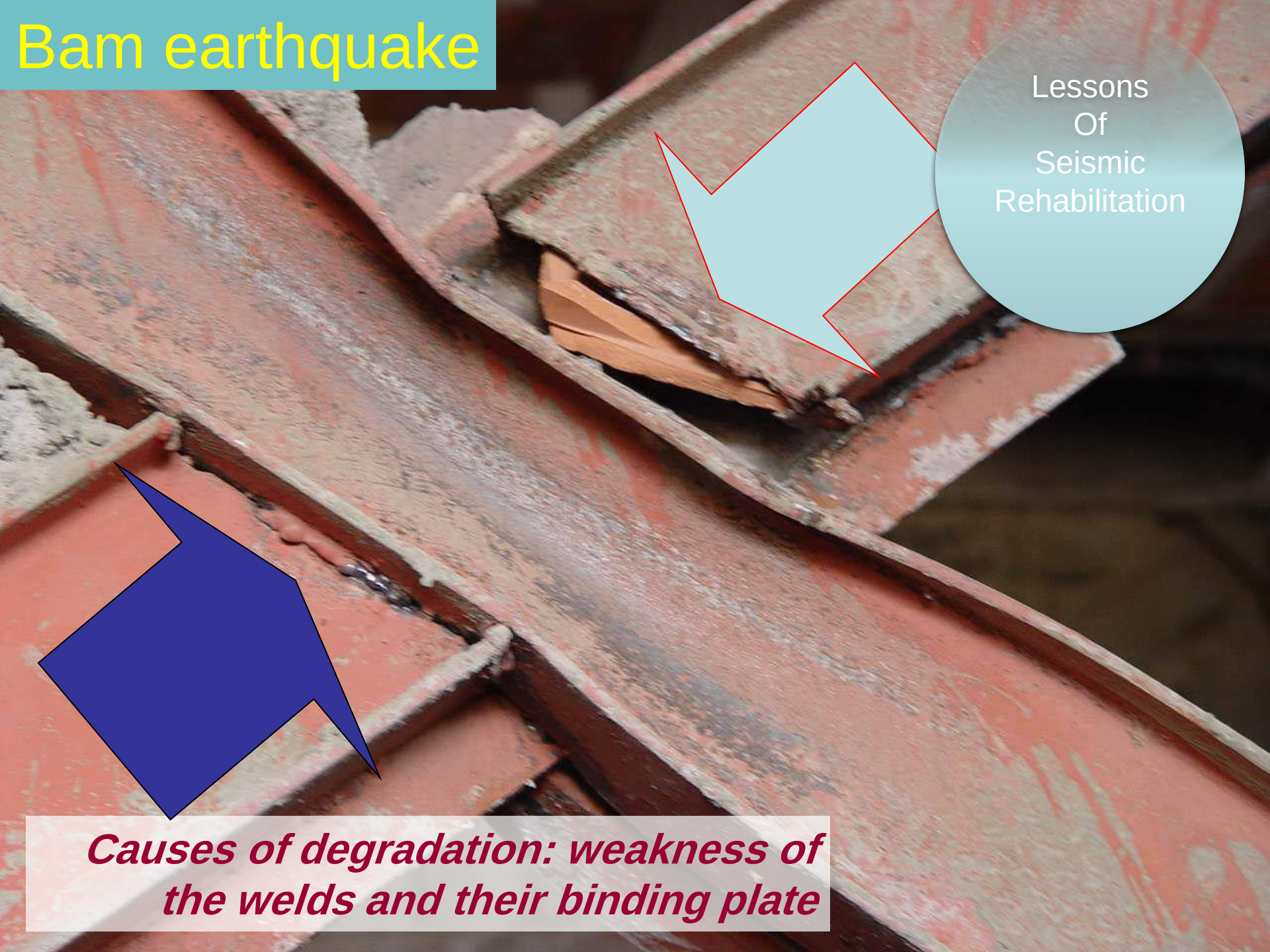
Causes of Degradation: Removing the side columns and implementing the load bearing wall instead

Bam earthquake



Causes of Damage: The weakness of the loop straps and the removal of barriers to connect the column to the wall

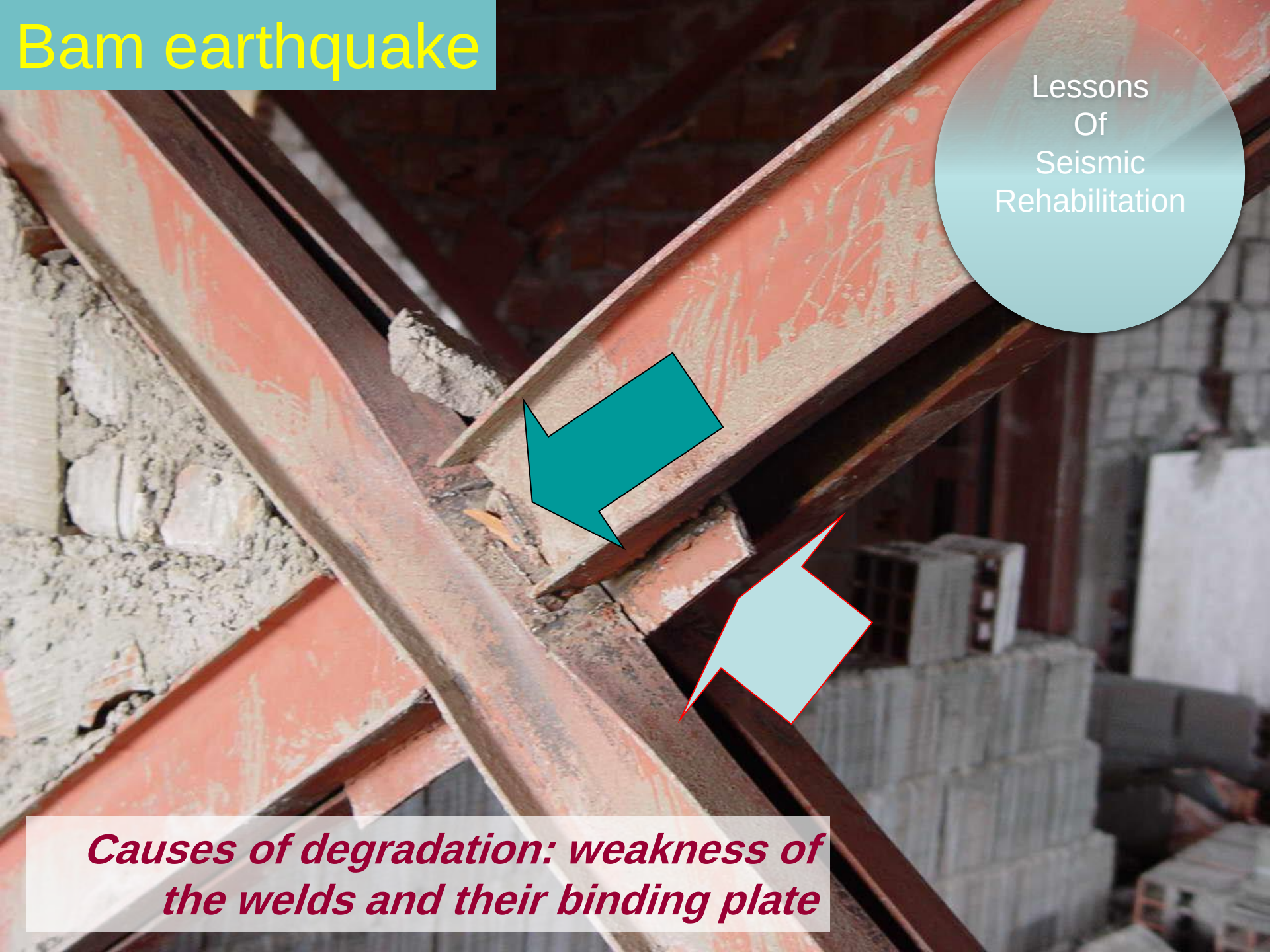
Bam earthquake



Causes of degradation: weakness of the welds and their binding plate

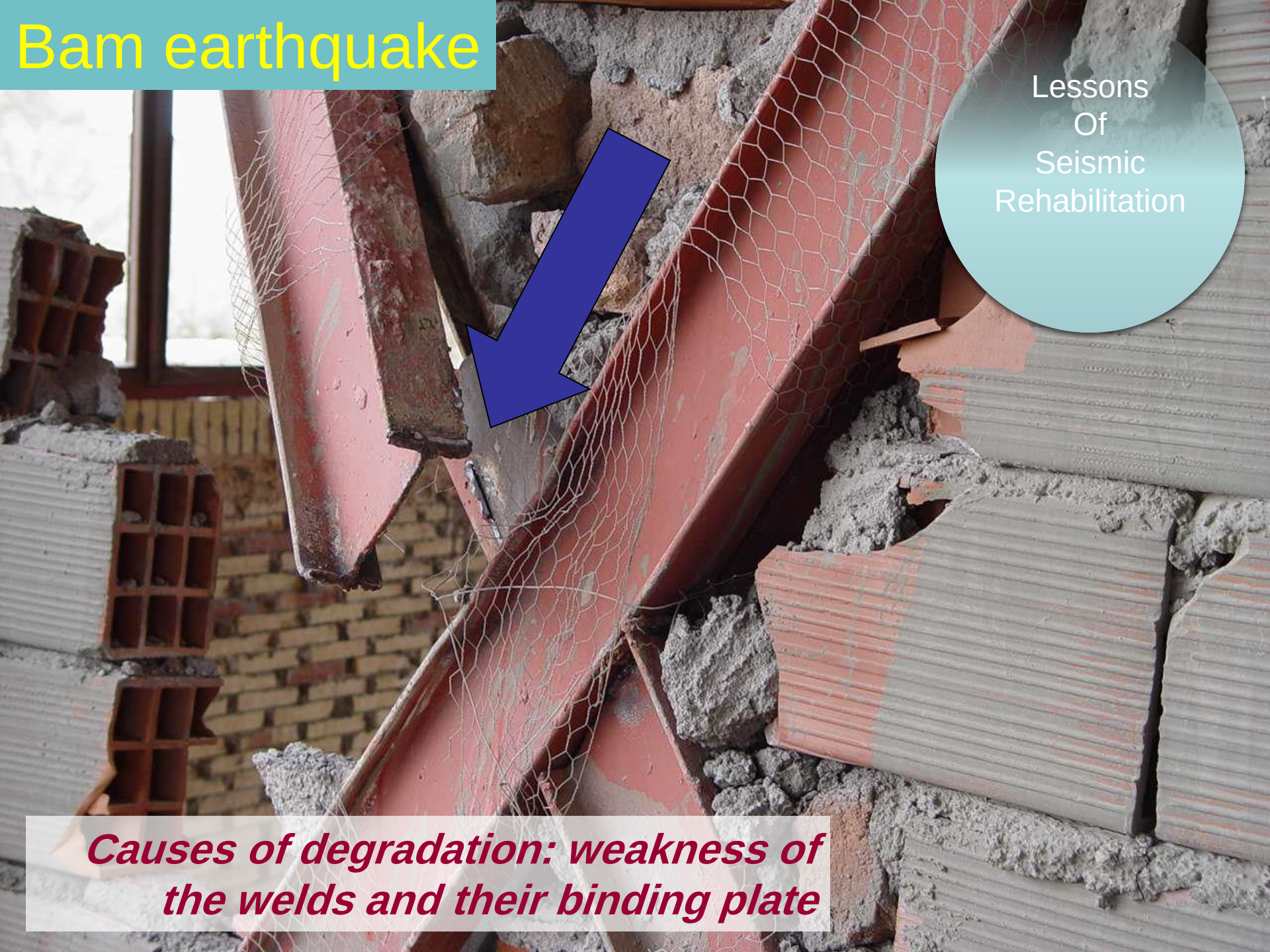
Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of degradation: weakness of the welds and their binding plate

Bam earthquake

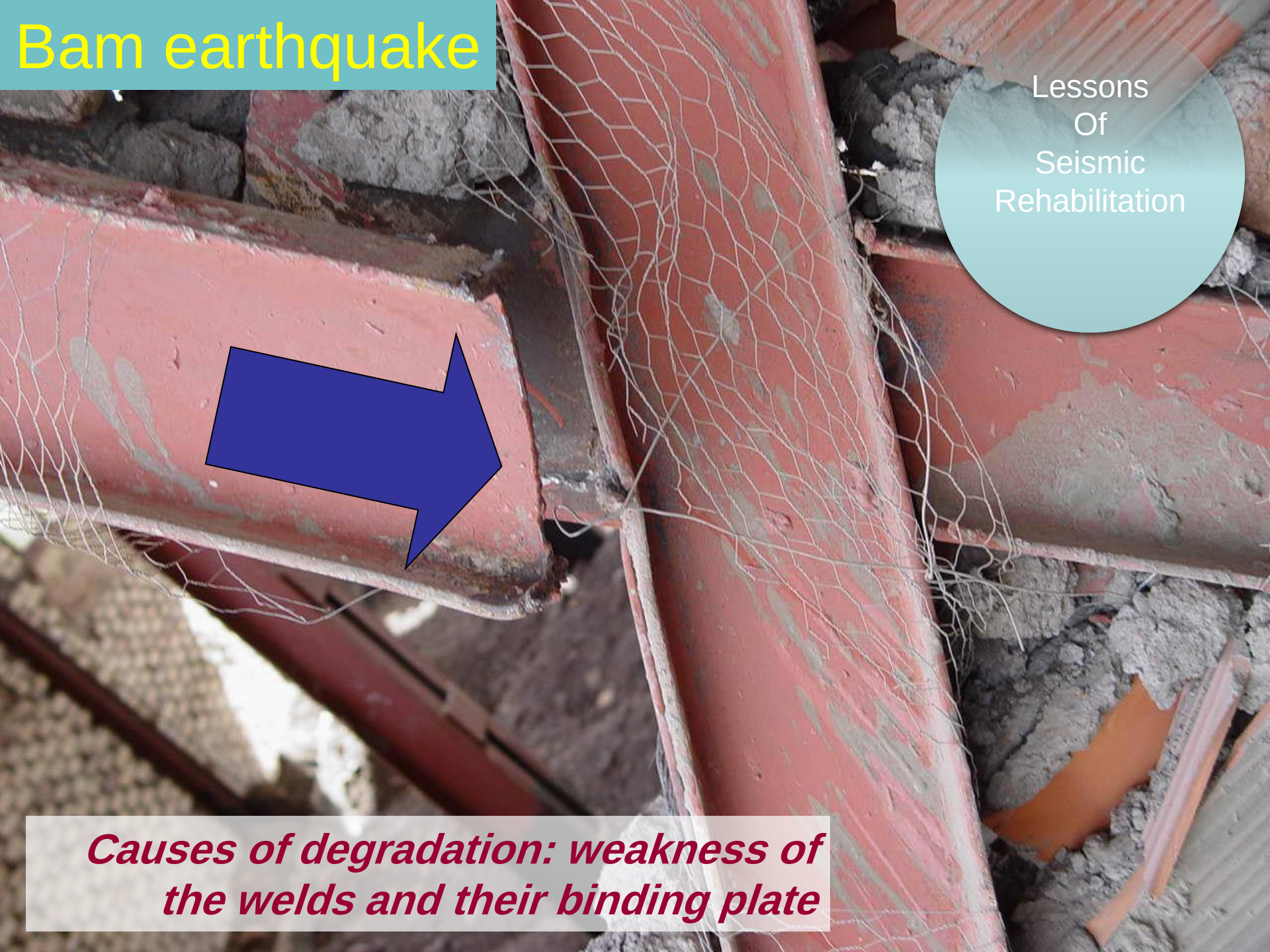


Lessons
Of
Seismic
Rehabilitation

Causes of degradation: weakness of the welds and their binding plate

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of degradation: weakness of the welds and their binding plate

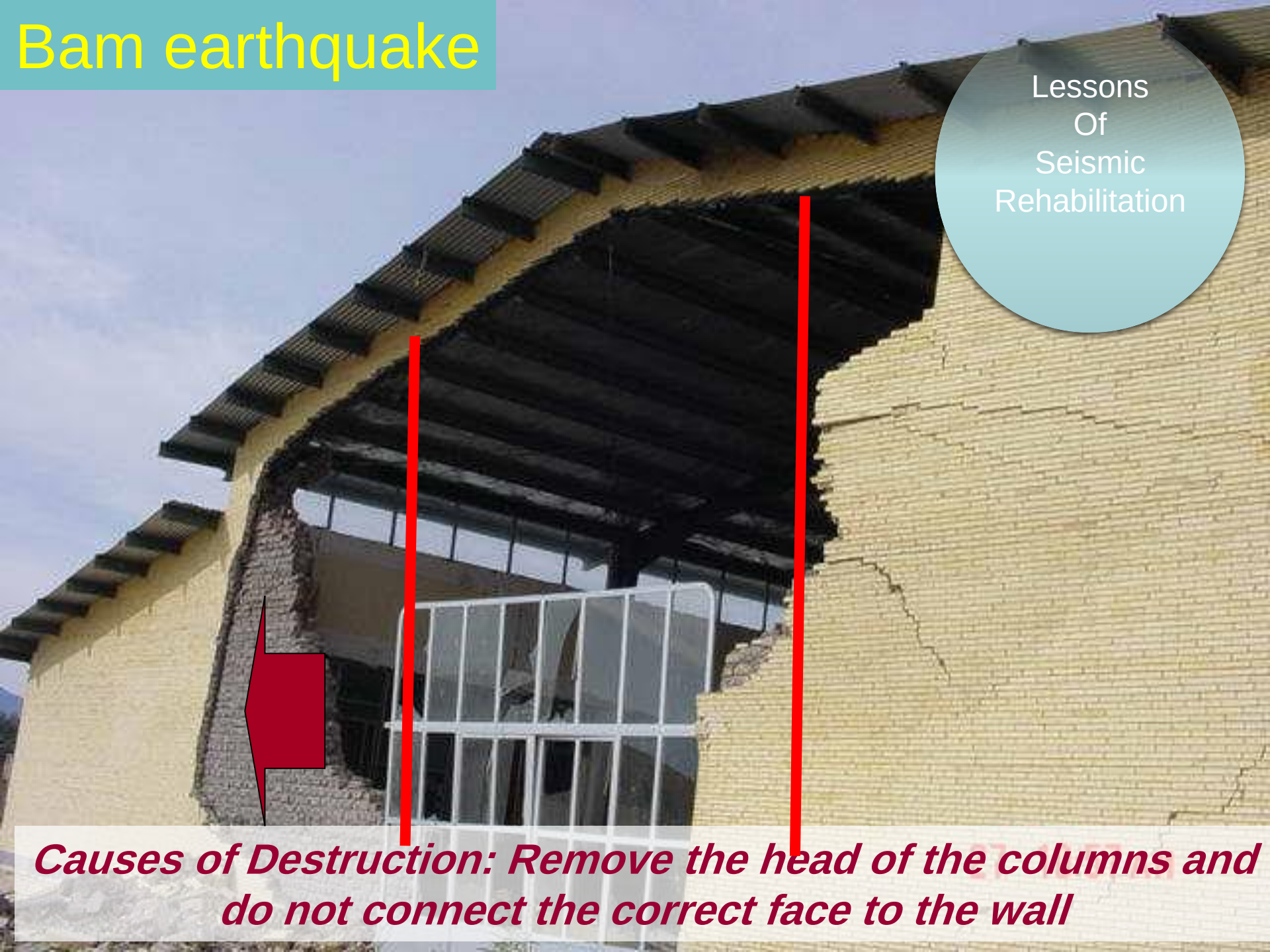
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Remove Extremely Inappropriate Connections and Welding

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: Remove the head of the columns and do not connect the correct face to the wall

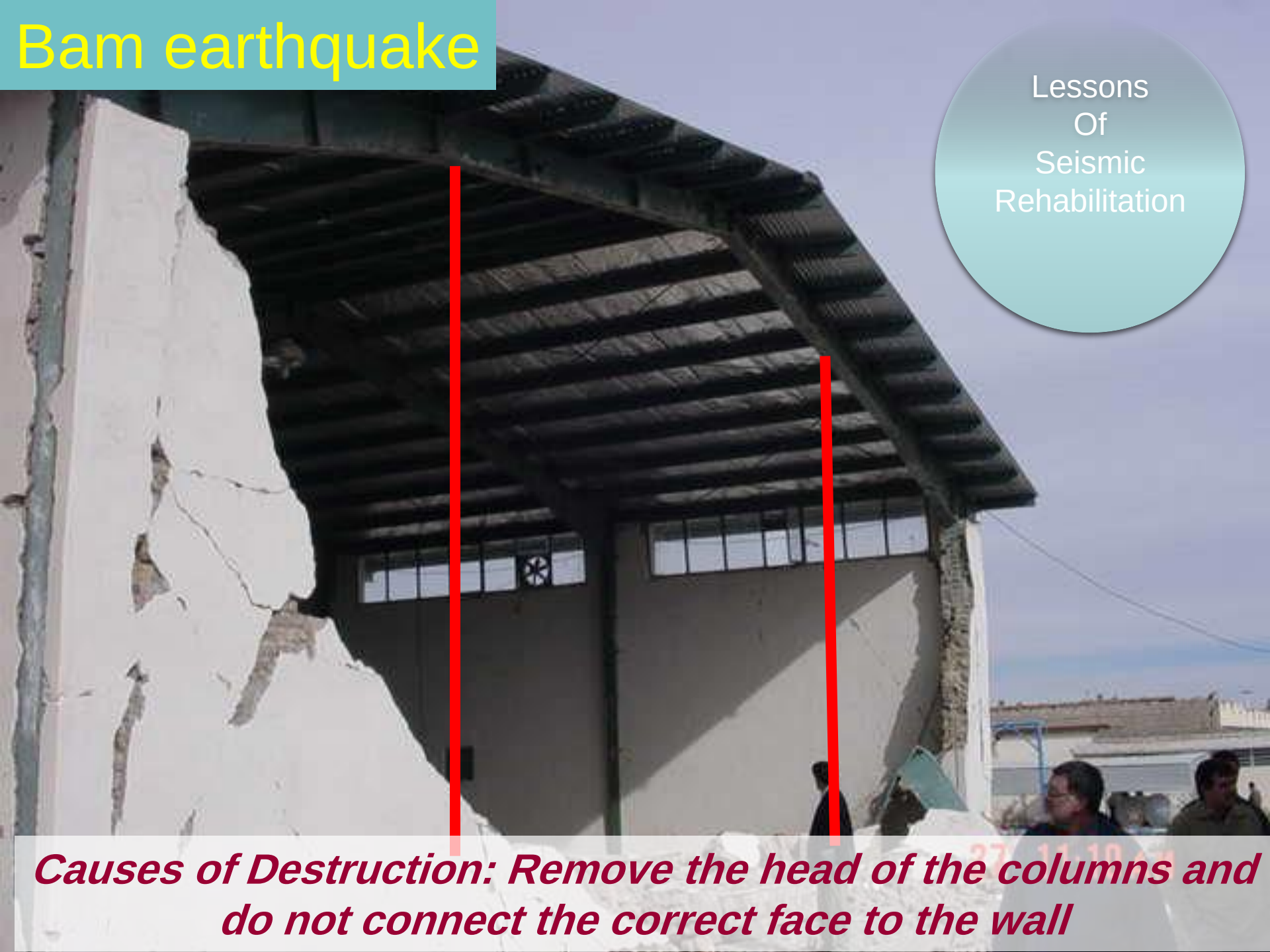
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Remove the head of the columns and do not connect the correct face to the wall

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: Remove the head of the columns and do not connect the correct face to the wall

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Being free and holding trusses on the walls

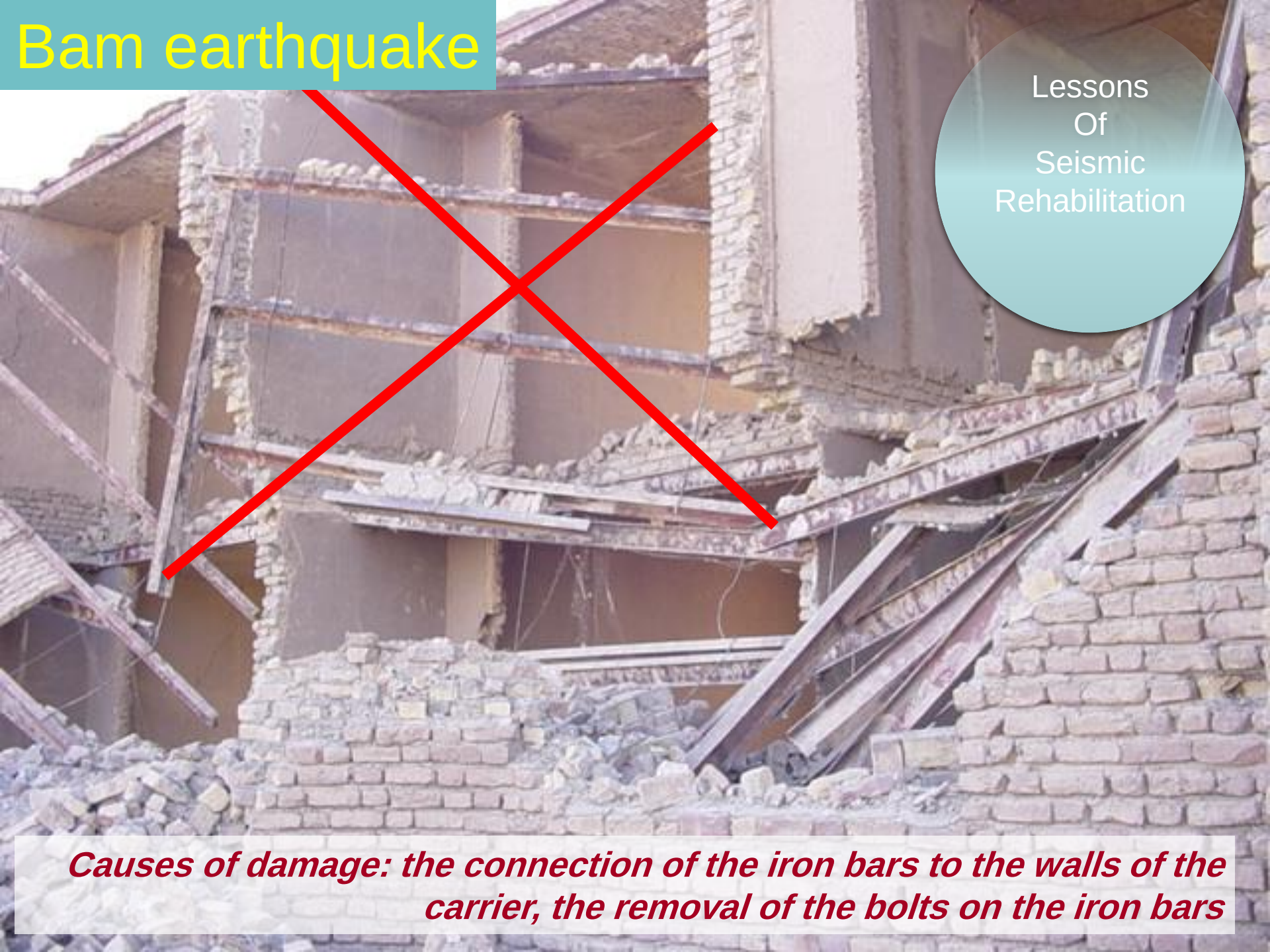
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of damage: the connection of the iron bars to the walls of the carrier, the removal of the bolts on the iron bars

Bam earthquake

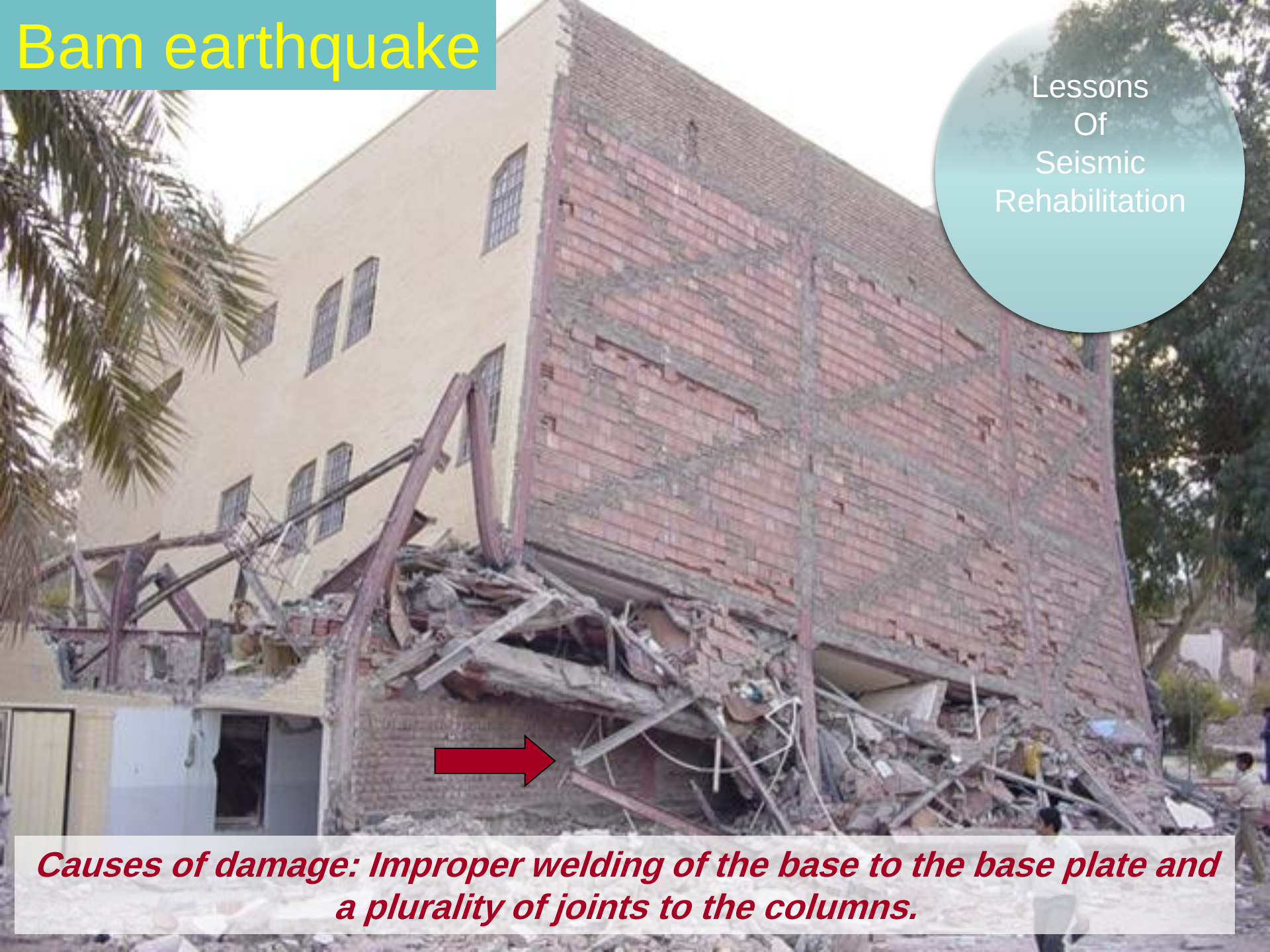
Lessons
Of
Seismic
Rehabilitation



Causes of damage: the connection of the iron bars to the walls of the carrier, the removal of the bolts on the iron bars

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



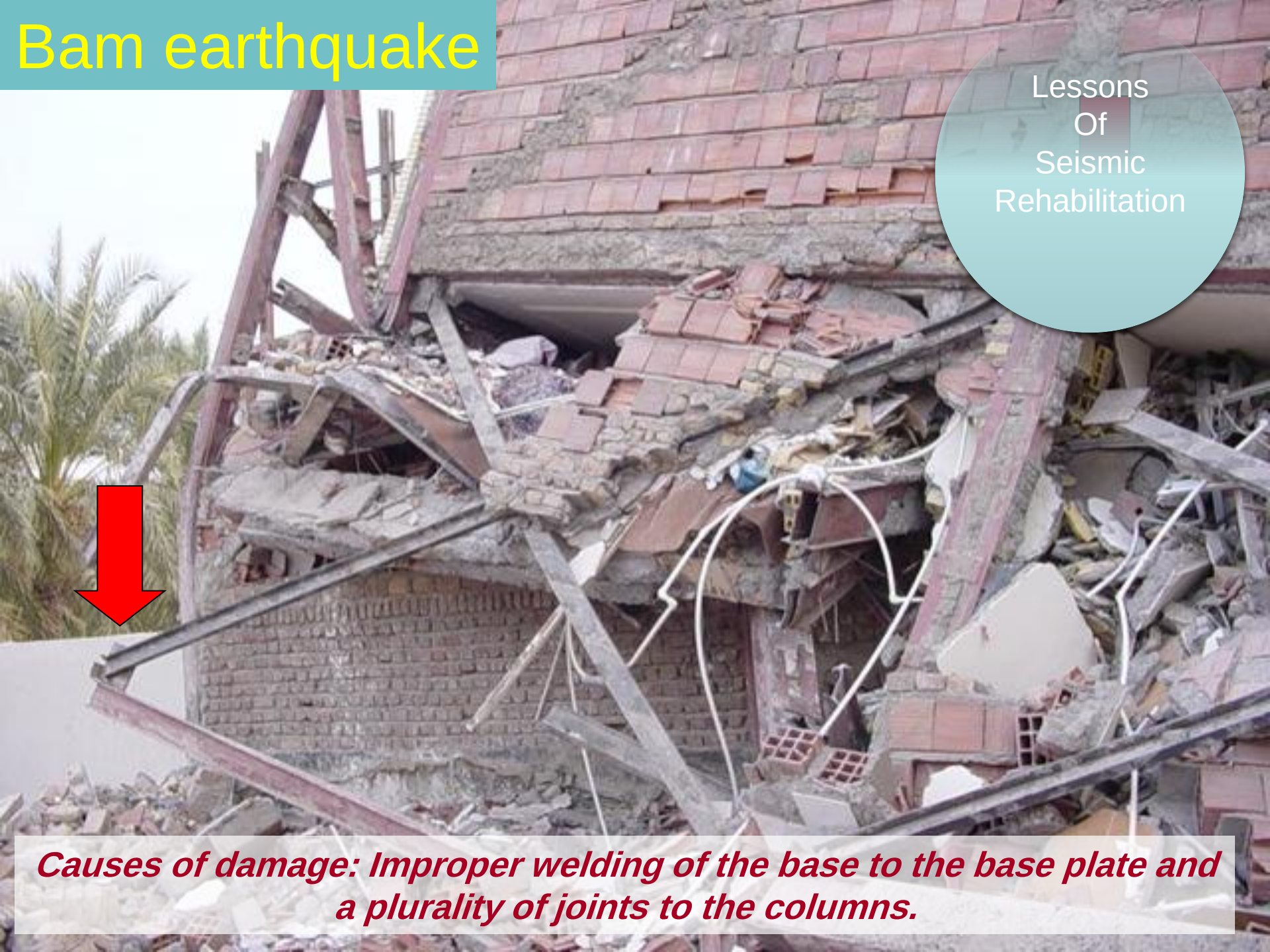
Causes of damage: Improper welding of the base to the base plate and a plurality of joints to the columns.

Bam earthquake

Causes of damage: Improper welding of the base to the base plate and a plurality of joints to the columns.

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of damage: Improper welding of the base to the base plate and a plurality of joints to the columns.

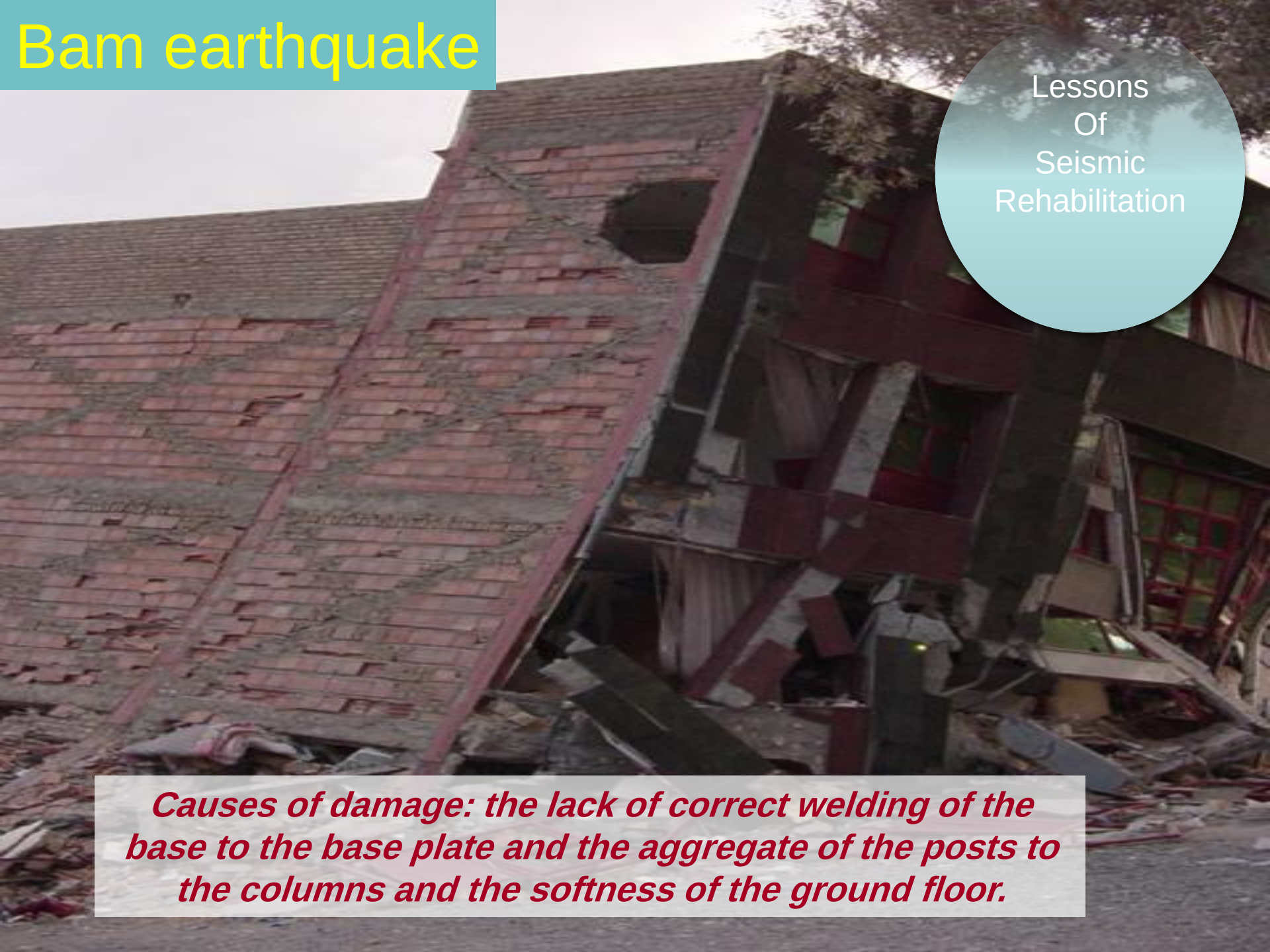
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of damage: the lack of correct welding of the base to the base plate and the aggregate of the posts to the columns and the softness of the ground floor.

Bam earthquake

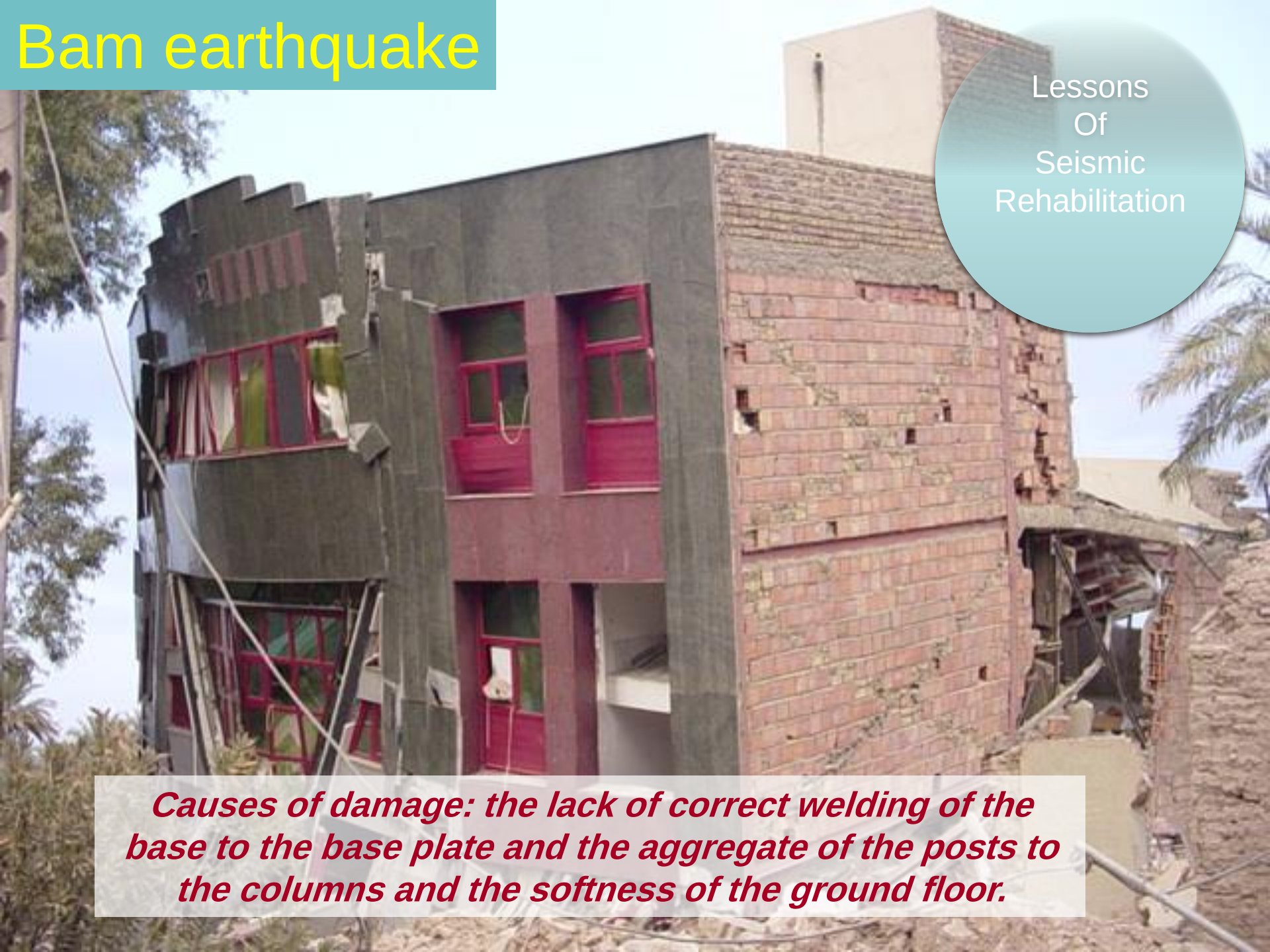
Lessons
Of
Seismic
Rehabilitation



Causes of damage: the lack of correct welding of the base to the base plate and the aggregate of the posts to the columns and the softness of the ground floor.

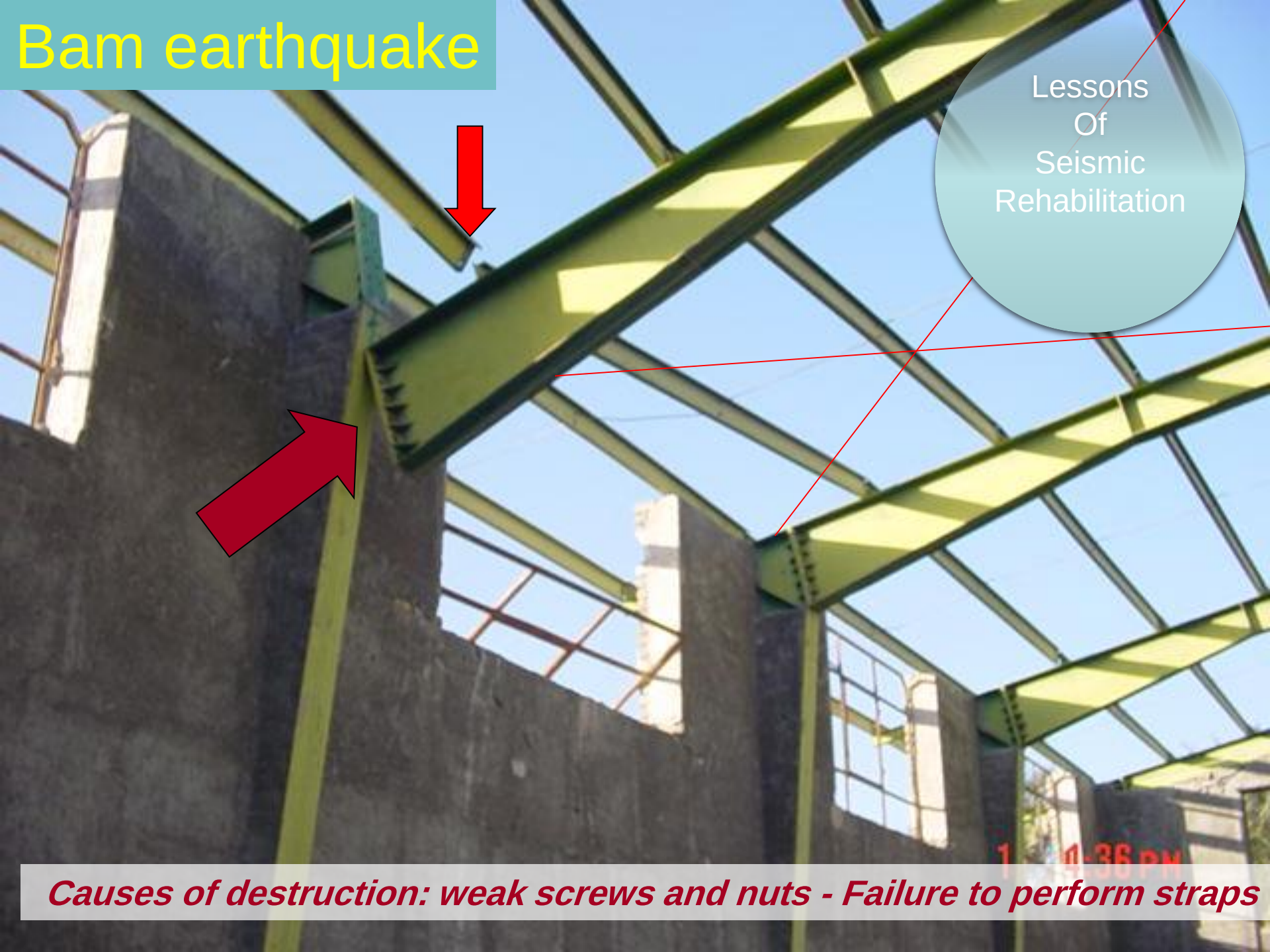
Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of damage: the lack of correct welding of the base to the base plate and the aggregate of the posts to the columns and the softness of the ground floor.

Bam earthquake



Causes of destruction: weak screws and nuts - Failure to perform straps

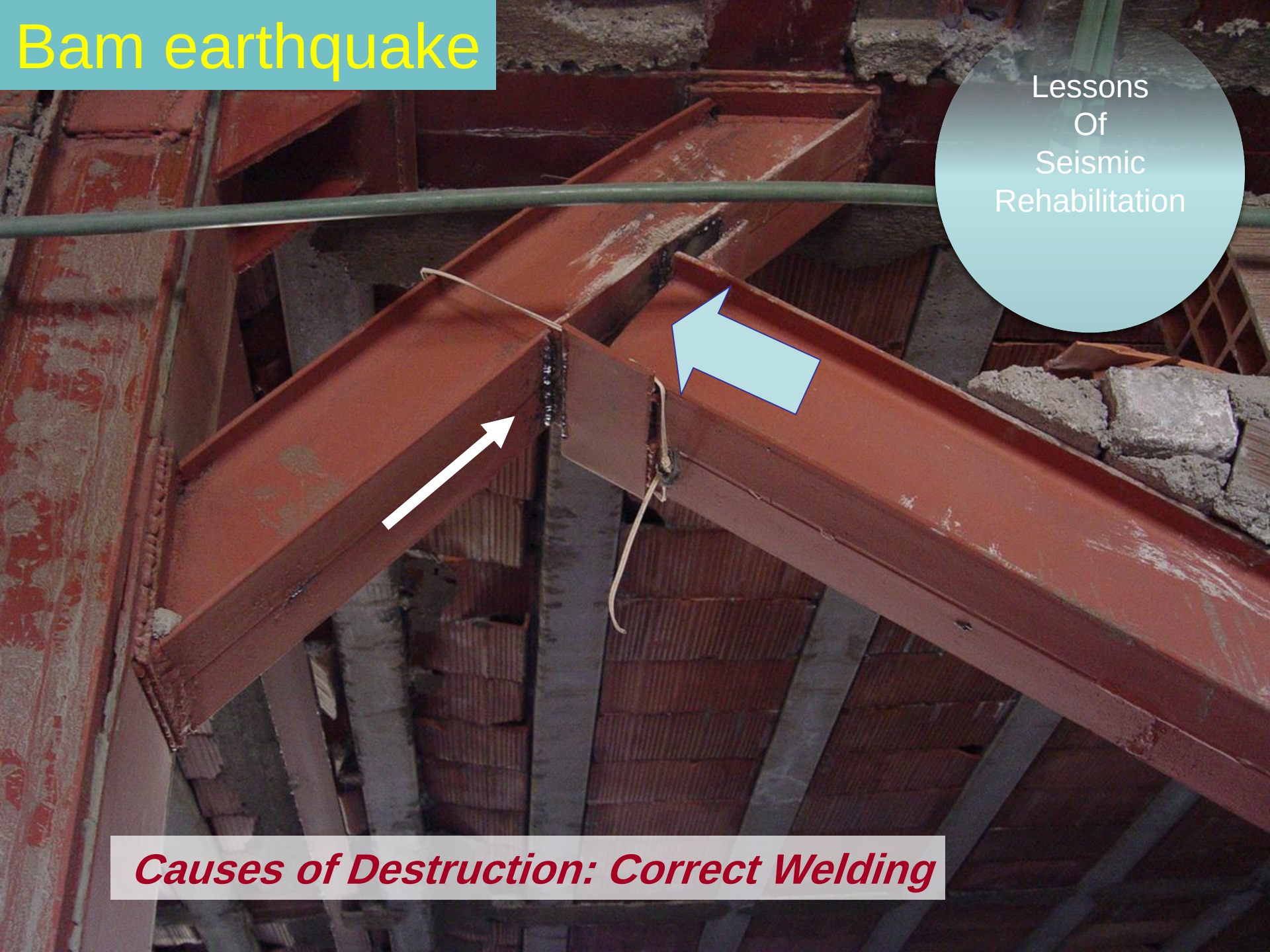
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Correct Welding

Bam earthquake

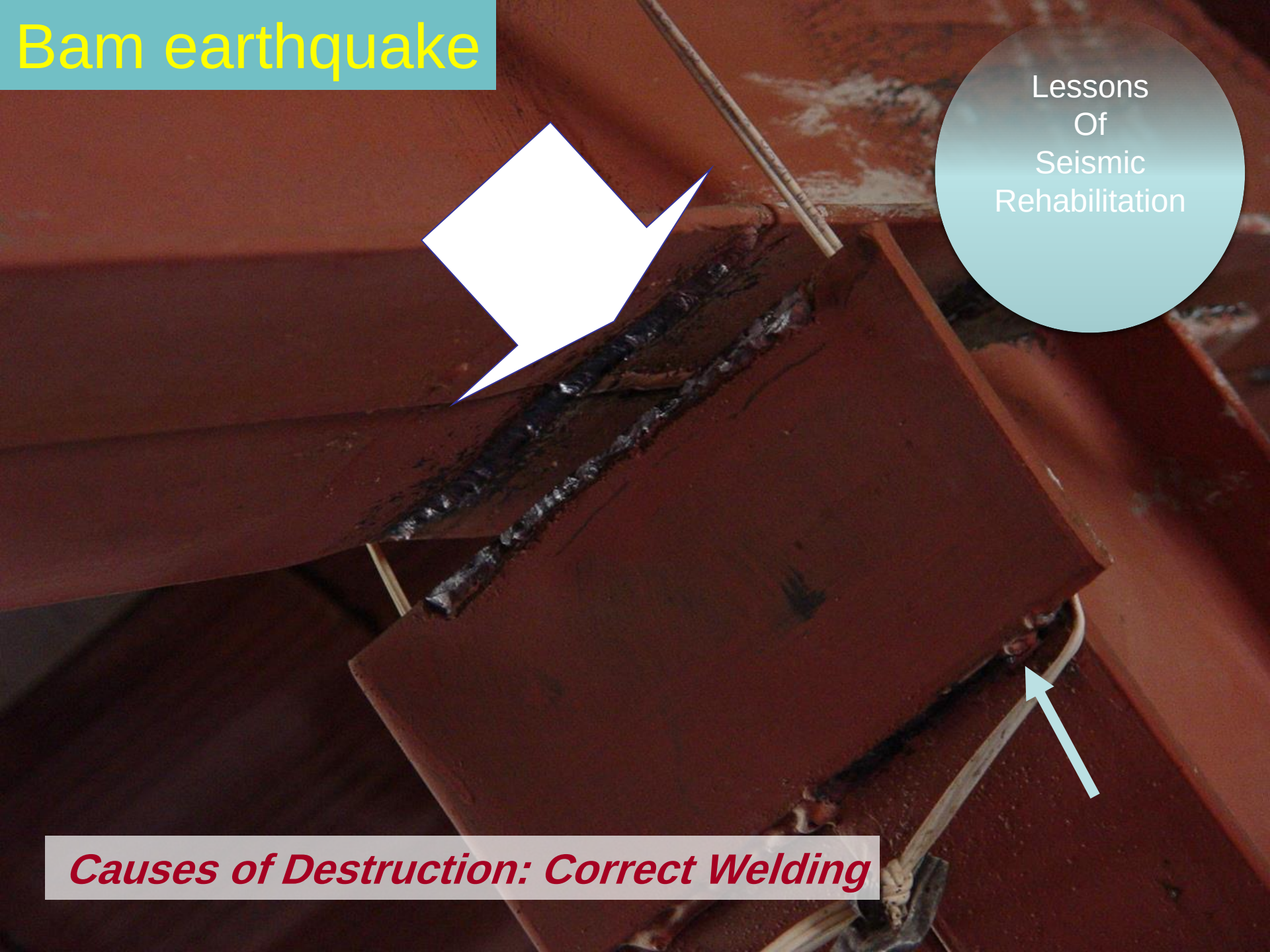
Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: Correct Welding

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



Causes of Destruction: Correct Welding

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of damage: Stainless welding failure - No proper connection of walls to metal columns and removal of joints

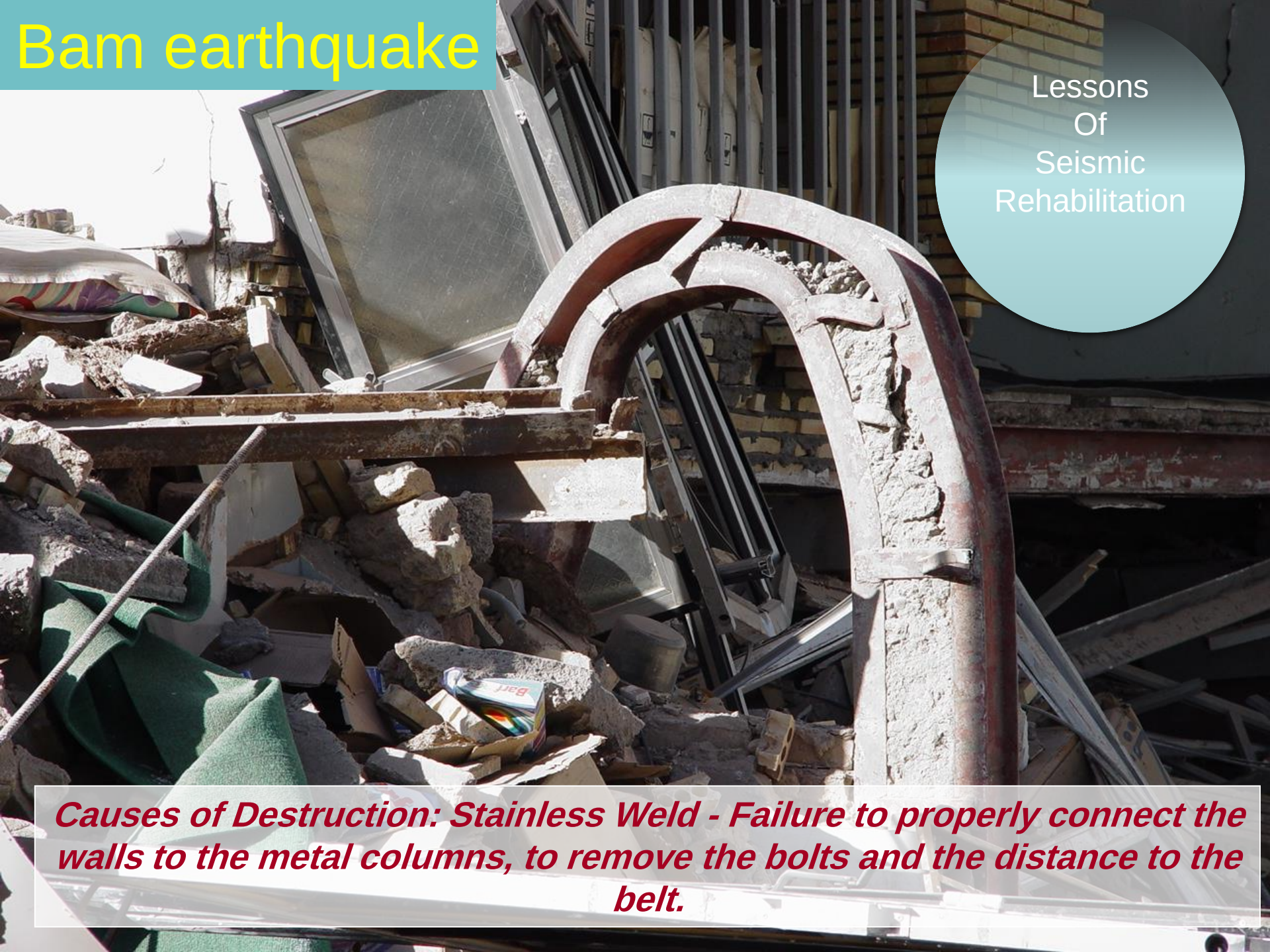
Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of damage: Stainless welding failure - No proper connection of walls to metal columns and removal of joints

Bam earthquake

Lessons
Of
Seismic
Rehabilitation



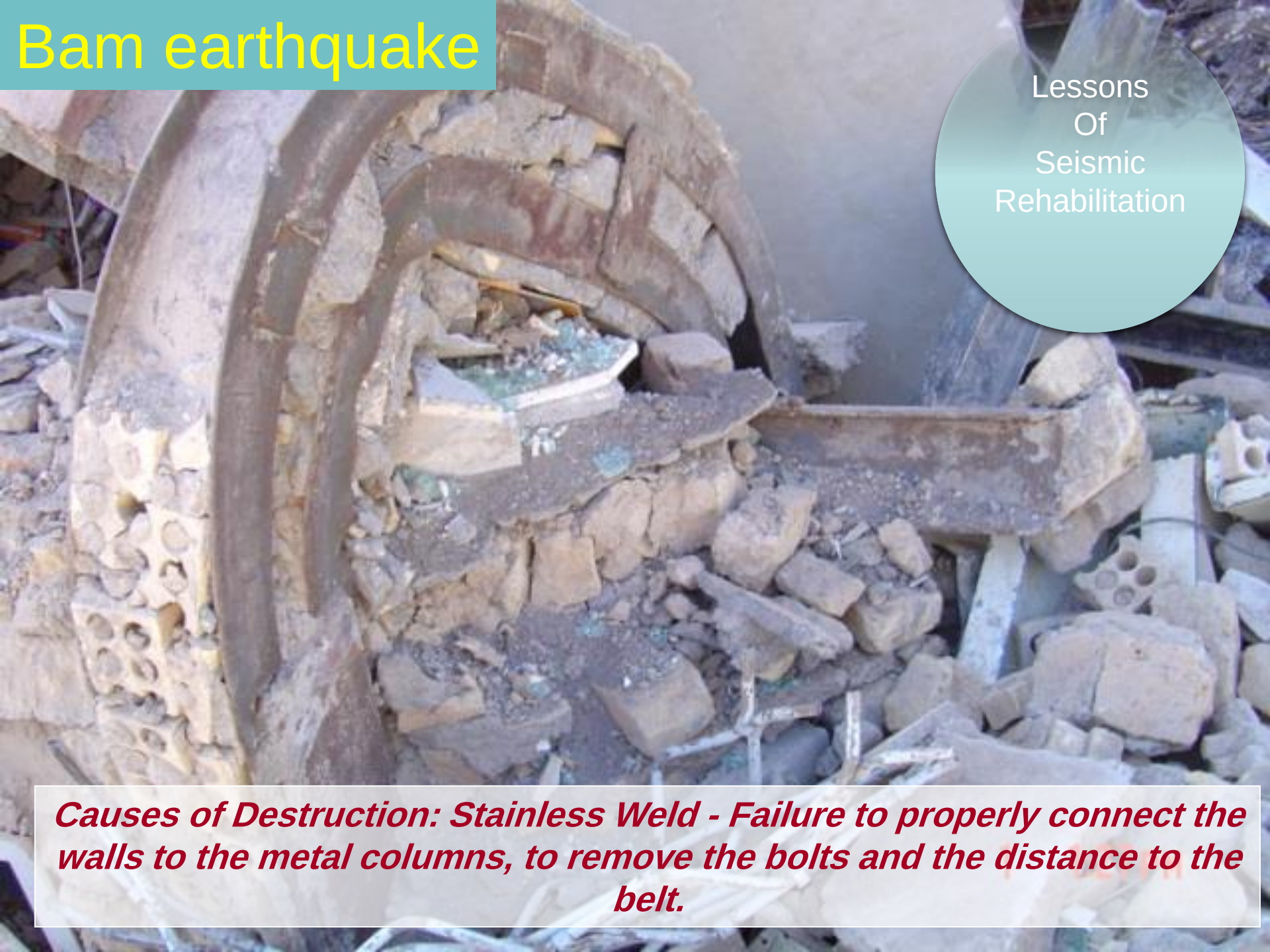
Causes of Destruction: Stainless Weld - Failure to properly connect the walls to the metal columns, to remove the bolts and the distance to the belt.

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Stainless Weld - Failure to properly connect the walls to the metal columns, to remove the bolts and the distance to the belt.

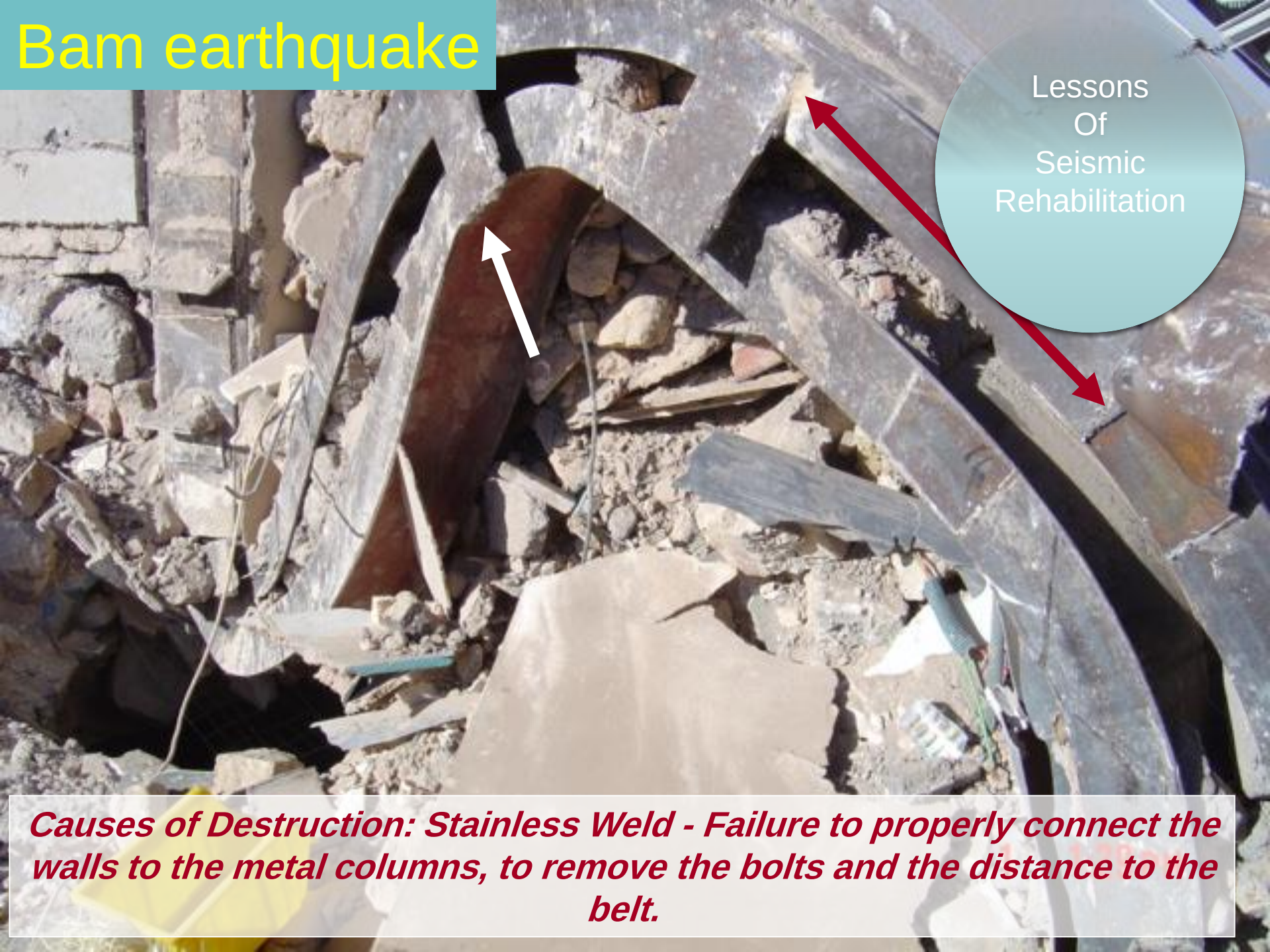
Bam earthquake



Lessons
Of
Seismic
Rehabilitation

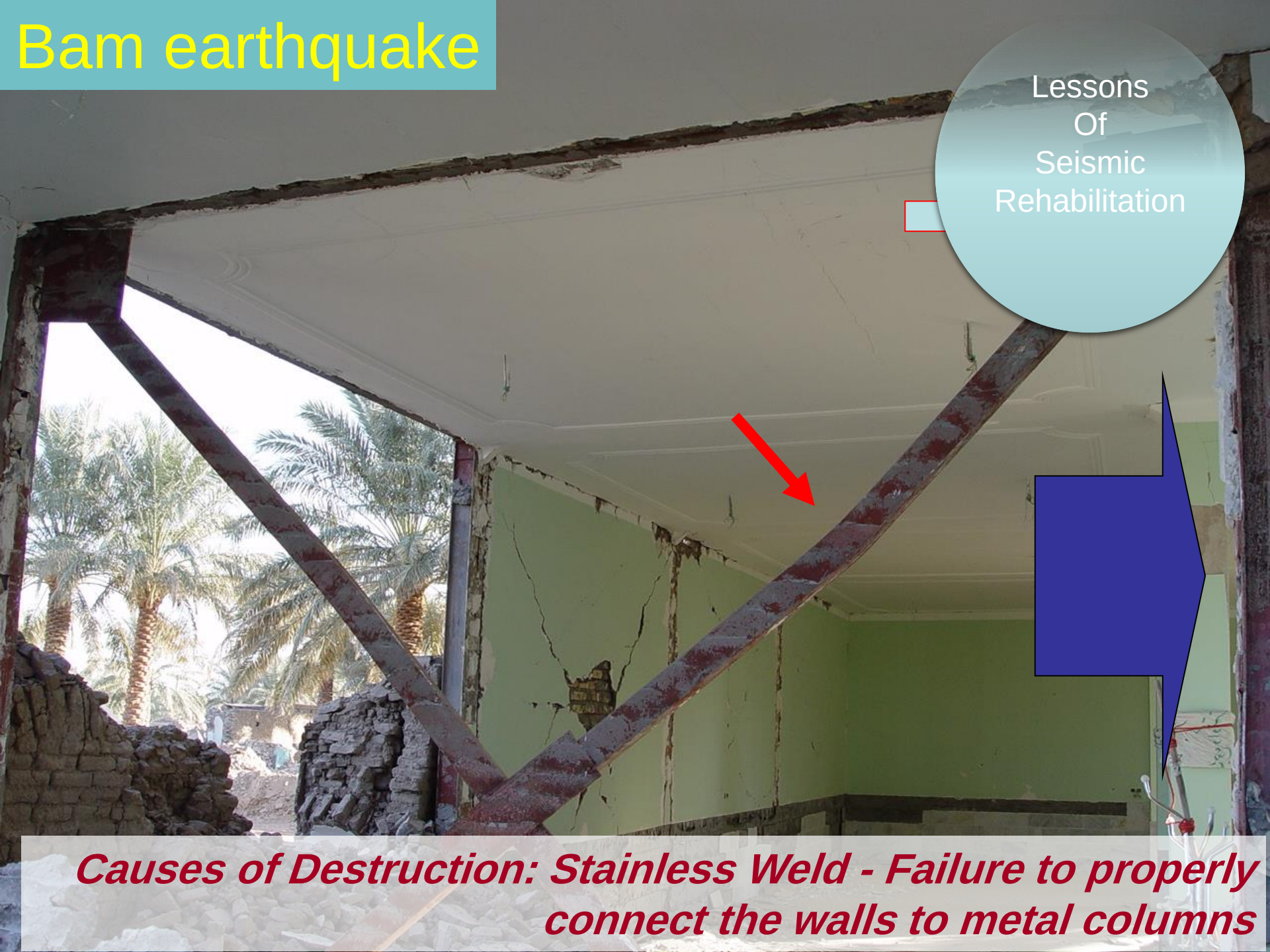
Causes of Destruction: Stainless Weld - Failure to properly connect the walls to the metal columns, to remove the bolts and the distance to the belt.

Bam earthquake



Causes of Destruction: Stainless Weld - Failure to properly connect the walls to the metal columns, to remove the bolts and the distance to the belt.

Bam earthquake



Causes of Destruction: Stainless Weld - Failure to properly connect the walls to metal columns

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Stainless Weld - Failure to properly connect the walls to metal columns

Bam earthquake

Causes of damage: Stainless welding failure - No proper connection of walls to metal columns and removal of joints

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of damage: Stainless welding failure - No proper connection of walls to metal columns and removal of joints

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of damage: Stainless welding failure - No proper connection of walls to metal columns and removal of joints

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Stainless Weld - Failure to properly connect the walls to metal columns

Bam earthquake

Lessons
Of
Seismic
Rehabilitation

Causes of Destruction: Stainless Weld - Failure to properly connect the walls to metal columns and ...

Bam earthquake

Lessons
Of
Seismic
Rehabilitation