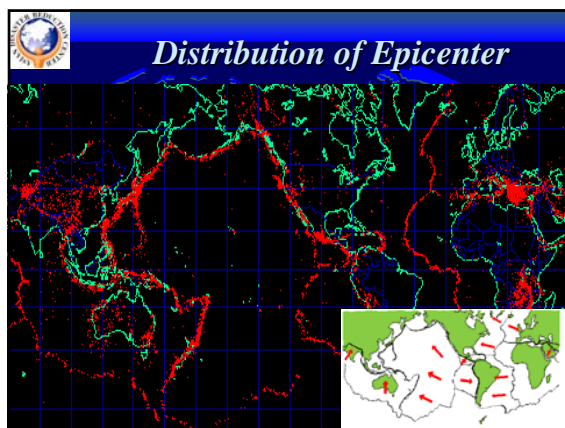
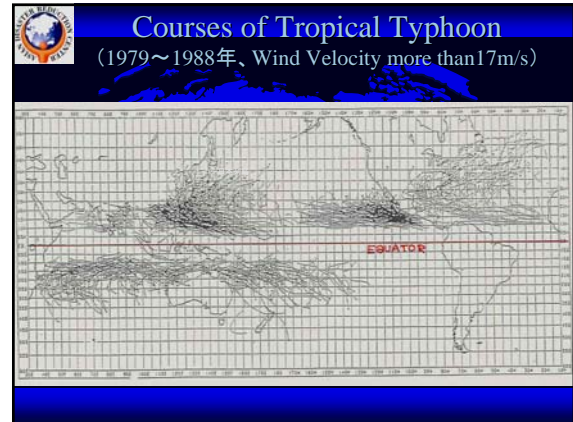


Lesson Learnt from Past Japanese Natural Disaster Experience

YUJIRO OGAWA

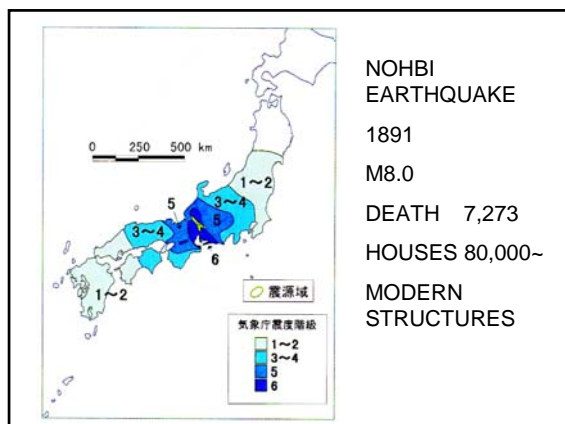
DEAN, DEPARTMENT OF ENVIRONMENT AND DISASTER RESEARCH
FUJI-TOKOHA-UNIVERSITY

2007.11.28



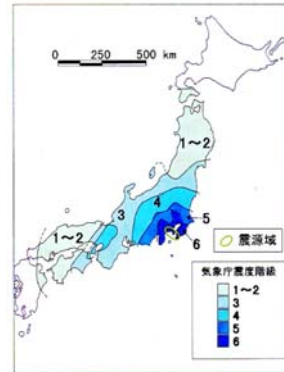
MAIN EARTHQUAKE DISASTERS IN JAPAN

SINCE 20 CENTURY





BRICKS STRUCTURES



KANTOH
EARTHQUAKE
1923,9.1
M7.9
DEATH 142,000~
MOSTLY BY FIRE
HOUSES 254,000
SEISMIC CODE
0.1 G



1911 NIHONBASHI BRIDGE



PEOPLE ON NIHONBASHI BRIDGE



EPICENTER and FIRE IN TOKYO



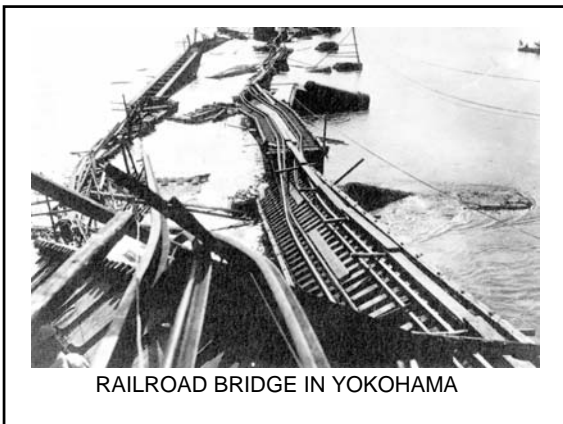
FIRE AFTER EARTHQUAKE



40,000 KILLED BY FIRE



12 FLOORS BRICKS BUILDING



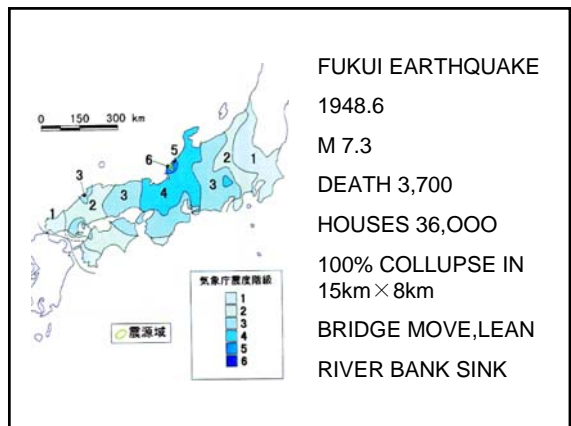
RAILROAD BRIDGE IN YOKOHAMA

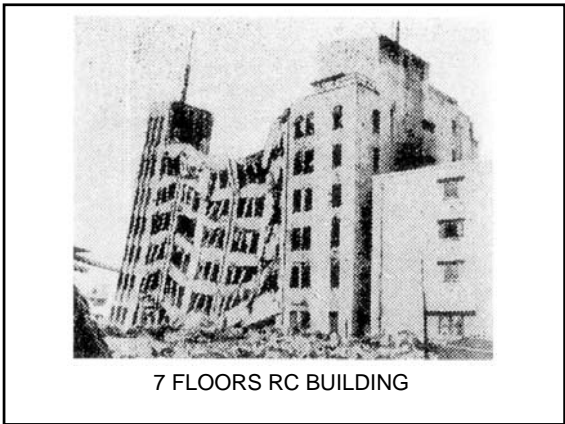


BRICKS BUILDINGS and FIRE IN YOKOHAMA

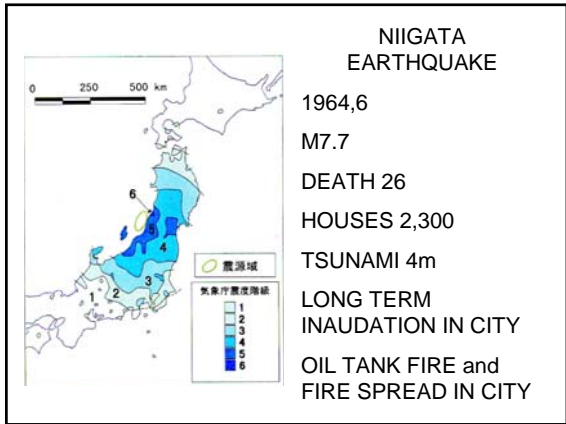


DERAIL OF S.L. TRAIN



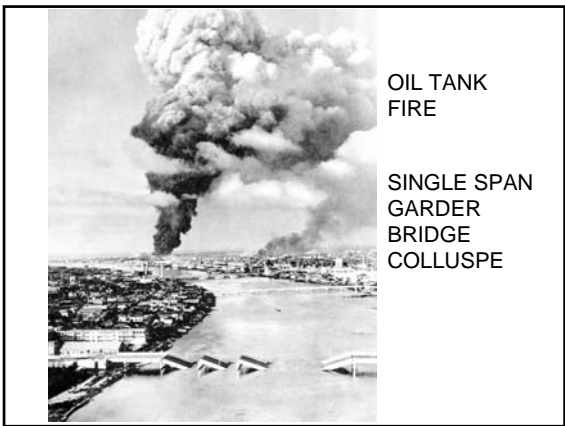


7 FLOORS RC BUILDING



NIIGATA EARTHQUAKE

1964,6
 M7.7
 DEATH 26
 HOUSES 2,300
 TSUNAMI 4m
 LONG TERM
 INAUDATION IN CITY
 OIL TANK FIRE and
 FIRE SPREAD IN CITY

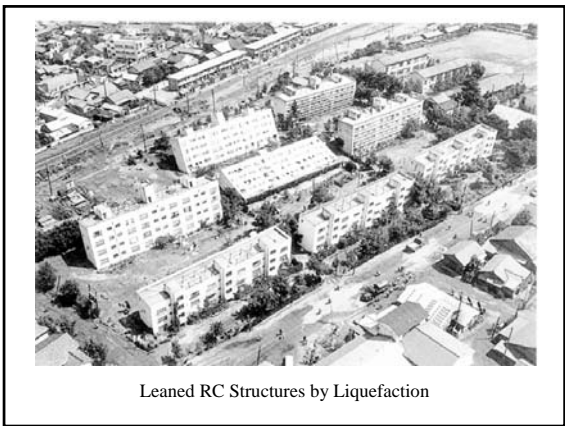


OIL TANK
 FIRE

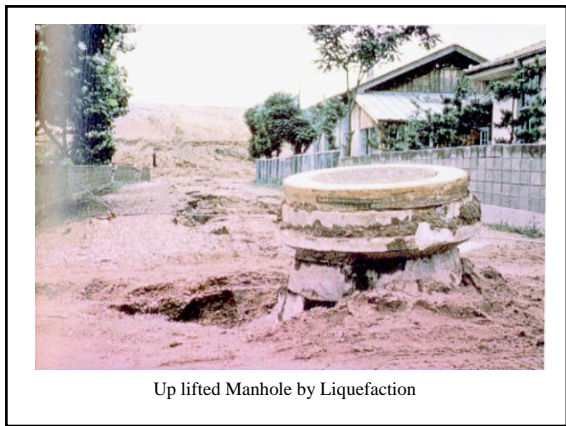
 SINGLE SPAN
 GARDER
 BRIDGE
 COLLUSPE



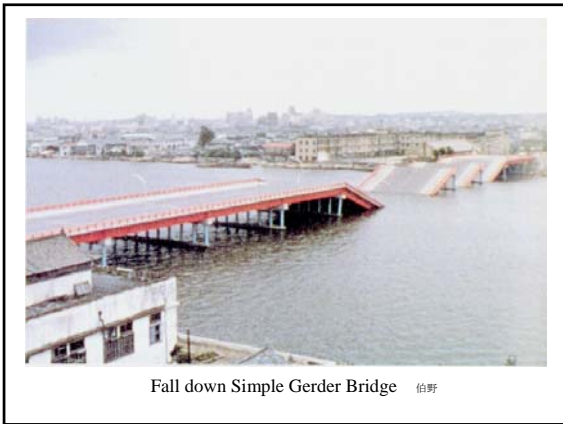
1964年新潟地震 新潟空港の液状化



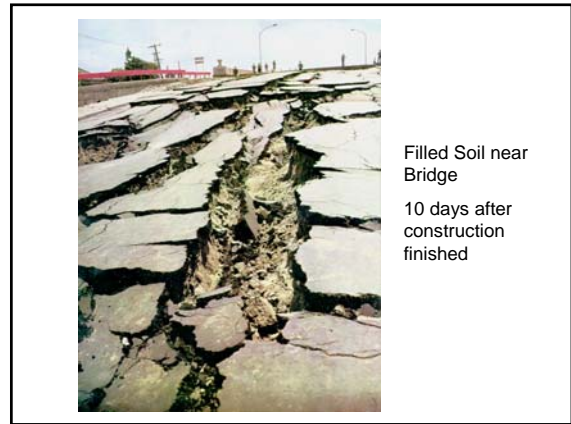
Leaned RC Structures by Liquefaction



Up lifted Manhole by Liquefaction



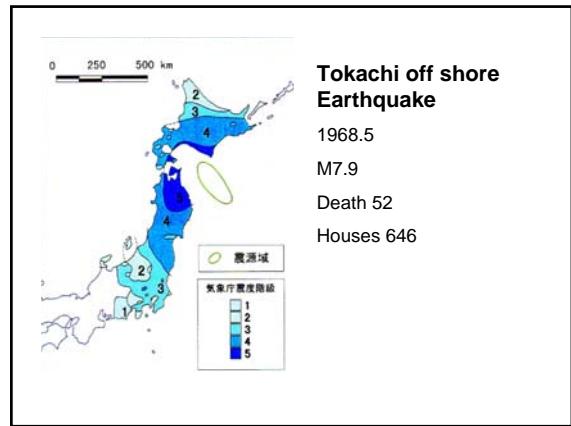
Fall down Simple Gerder Bridge 伯野



Filled Soil near Bridge
10 days after construction finished



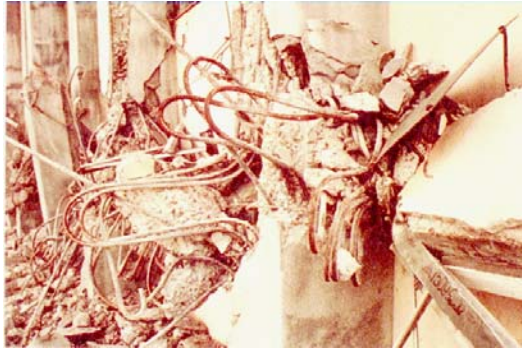
Niigata City attacked by Fire, Spilled Oil, Tsunami



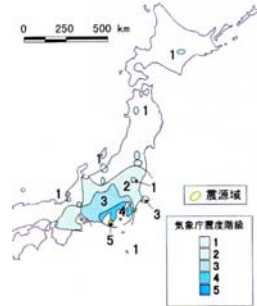
First Floor Damage in University Building



Share Failure of Short Colum

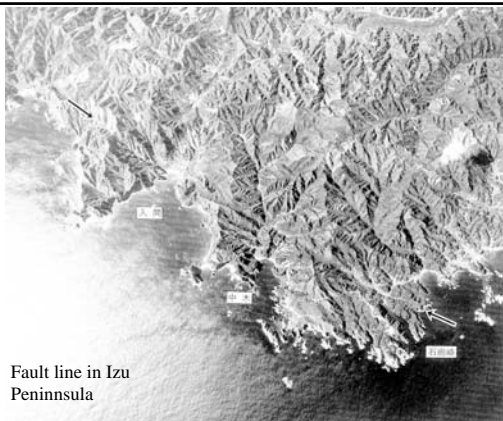


Compression Failure by Insufficient Star-lap

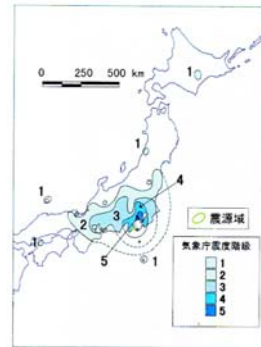


Izu Peninsula Near Shore Earthquake

1974.5
 M 6.9
 Death 30 persons
 Houses 134
 Land Slide 27persons



Fault line in Izu Peninsula

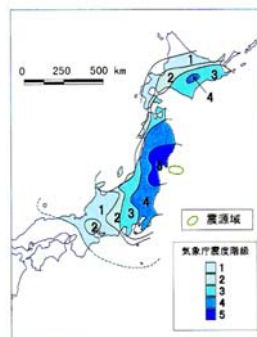


Izu Ooshima Ireland Near Shore Earthquake

1978.1
 M 7.0
 Death 25
 Houses 96
 Poison from Mining
 Earthquake Prediction
 By Pre Earthquake

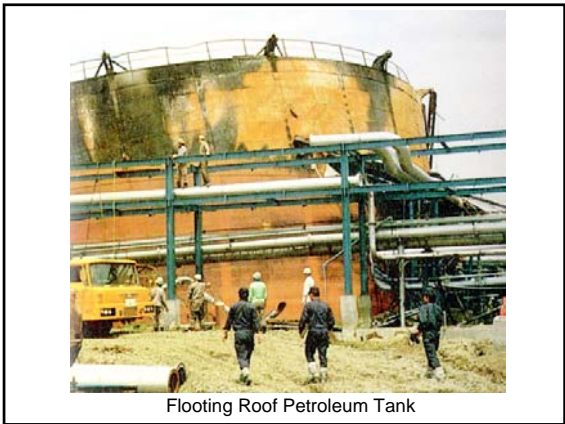


Railway Tunnel which Earthquake Fault passed



Miyagi-Ken Off Shore Earthquake

1978.6
 M 7.4
 Death 28
 Houses 1,180
 Damage in modern City
 Lifeline Function Failed



Floating Roof Petroleum Tank

Mid Japan Sea Earthquake
 1983.5
 M7.7
 Death 104 (100 by Tsunami)
 Houses 167
 Lessons
 Risk of Tsunami in Japan Sea Side



7 minutes after Earthquake

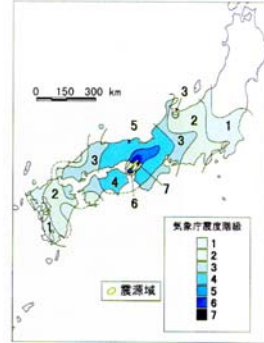
South West Off-Shore of Hokkaido Earthquake
 1993.7
 M7.8
 Death 340 (Most by Tsunami)
 Houses 601
 Tsunami height 29m
 Warning issued after Tsunami, System was improved that warning is issued in 1 to 2 minutes



Okushiri Island after Tsunami



街の中に入りました津波



Hanshin Awaji Earthquake

1995.1.17
M 7.2
Death 6,396
Houses 436,000
Fully Collapsed 105,000
Burned 7,000



Collapse of Middle Floor



ピロティ形式構造の崩壊 朝日



Japanese Style Houses (Heavy Roof)



Narrow Pass



One Column Highway Bridge



One Column Highway Bridge



Rokko Oohashi Bridge



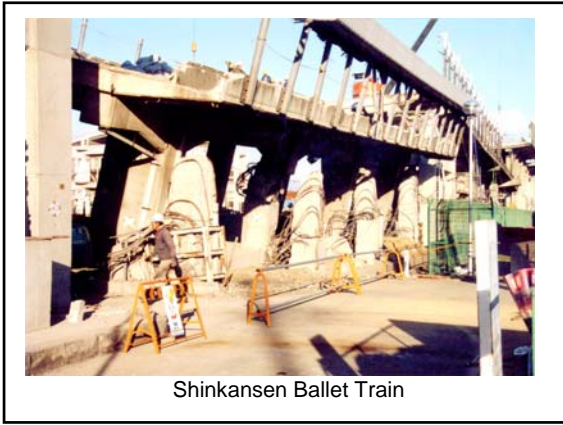
Side Slip of Pier



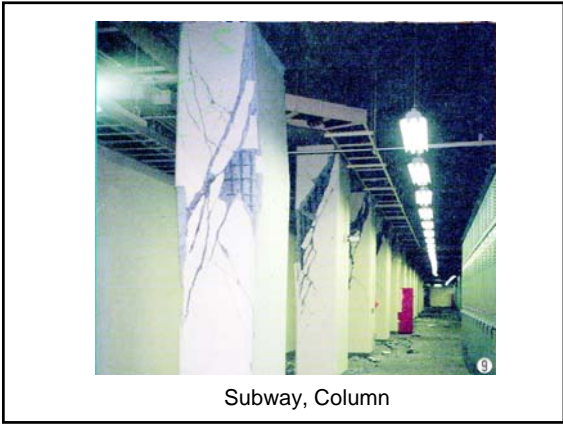
Side Slip of Pier



Rail Road Bridge



Shinkansen Ballet Train



Subway, Column



Subway, Open Cut Column



Urban Fire



被災後の長田区の様子を
神戸市職員が撮影



空から NHK提供

