The New Tsunami Intensity Scale

The new tsunami intensity scale, which was introduced by Papadopoulos and Imamura (Proposal for a new tsunami intensity scale. Proc. 20th Internat. Tsunami Confer., Seattle, 7–9 Aug. 2001, 569-577, 2001), incorporates 12 divisions and is consistent with the 12-grade seismic intensity scales. The new scale is arranged according to the effects on humans, on nature and objects, including vessels of variable size, and on buildings and other engineered constructions. A short introduction to the scale can be found in the "Tsunami Glossary, IOC/UNESCO and International Tsunami Information Centre, USA, 2006 (p. 6)". In te next lines the full description of the intensity scale follows.

I. Not felt

a) Not felt even under the most favourable circumstances.
b) No effect.
c) No damage.

II. Scarcely felt

a) Felt by few people on board in small vessels. Not observed in the coast.
b) No effect.
c) No damage.

III. Weak

a) Felt by most people on board in small vessels. Observed by few people in the coast.
b) No effect.
c) No damage.

IV. Largely observed

a) Felt by all on board in small vessels and by few people on board in large vessels. Observed by most people in the coast.
b) Few small vessels move slightly onshore.
c) No damage.

V. Strong

a) Felt by all on board in large vessels and observed by all in the coast. Few people are frightened and run to higher ground.
b) Many small vessels move strongly onshore, few of them crash each other or overturn. Traces of sand layer are left behind in grounds of favourable conditions. Limited flooding of cultivated land.
c) Limited flooding of outdoors facilities (e.g. gardens) of near-shore structures.

VI. Slightly damaging

a) Many people are frightened and run to higher ground.
b) Most small vessels move violently onshore, or crash stronly each other, or overturn.
c) Damage and flooding in a few wooden structures. Most masonry buildings withstand.

VII. Damaging

a) Most people are frightened and try to run in higher ground.

b) Many small vessels damaged. Few large vessels oscillate violently. Objects of variable size and stability overturn and drift. Sand layer and accumulations of pebbles are left behind. Few aquaculture rafts washed away.

c) Many wooden structures damaged, few are demolished or washed away. Damage of grade 1 and flooding in a few masonry buildings.

VIII. Heavily damaging

a) All people escape to higher ground, a few are washed away.

b) Most of the small vessels are damaged, many are washed away. Few large vessels are moved ashore or crashed each other. Big objects are drifted away. Errosion and littering in the beach. Extensive flooding. Slight damage in tsunami control forest, stop drifts. Many aquaculture rafts washed away, few partially damaged.

c) Most wooden structures are washed away or demolished. Damage of grade 2 in a few masonry buildings. Most RC buildings sustain damage, in a few damage of grade 1 and flooding is observed.

IX. Destructive

a) Many people are washed away.

b) Most small vessels are destroyed or washed away. Many large vessels are moved violently ashore, few are destroyed. Extensive errosion and littering of the beach. Local ground subsidence. Partial destruction in tsunami control forest, stop drifts. Most aquaculture rafts washed away, many partially damaged.

c) Damage of grade 3 in many masonry buildings, few RC buildings suffer damage grade 2.

X. Very destructive

a) General panic. Most people are washed away.

b) Most large vessels are moved violently ashore, many are destroyed or collided with buildings. Small bolders from the sea bottom are moved inland. Cars overturned and drifted. Oil spill, fires start. Extensive ground subsidence.

c) Damage of grade 4 in many masonry buildings, few RC buildings suffer damage grade 3. Artificial embankments collapse, port water breaks damaged.

XI. Devastating

b) Lifelines interrupted. Extensive fires. Water backwash drifts cars and other objects in the sea. Big bolders from the sea bottom are moved inland.

c) Damage of grade 5 in many masonry buildings. Few RC buildings suffer damage grade 4, many suffer damage grade 3.

XII. Completely devastating

d) Practically all maronry buildings demolished. Most RC buildings suffer at least damage grade 3.

Classification of damage to buildings

Although the classification of damage to buildings due to earthquakes is well defined (e.g. Coburn and Spence, 1992) such a classification is not still available for damage to buildings due to tsunamis. Therefore, only a gross classification is used in association to the tsunami intensity scale:

Grade 1: Slight damage
Grade 2: Moderate damage
Grade 3: Heavy damage
Grade 4: Destruction
Grade 5: Total damage