

Fukui Torrential Rain in July 2004



Source

- Kinki Regional Development Bureau, Ministry of Land, Infrastructure and Transport and Fukui Prefecture: *Disaster by Fukui Torrential Rain in July 2004 (prompt report)*

- Tamai Nobuyuki: *Report of flood damage from torrential rain in July 2004 in Hokuriku on July, 2004, Civil Engineering, JSCE, Vol. 89 October 2004*

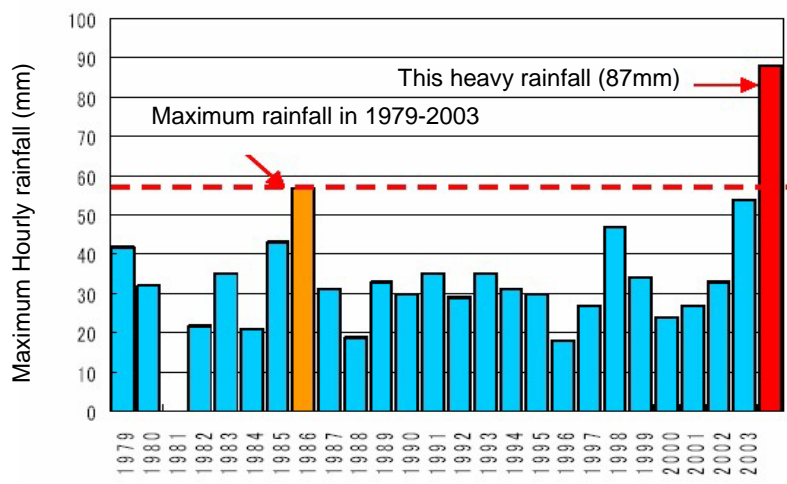
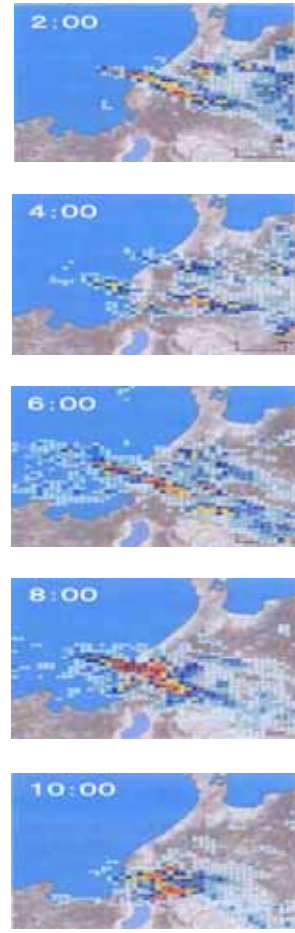
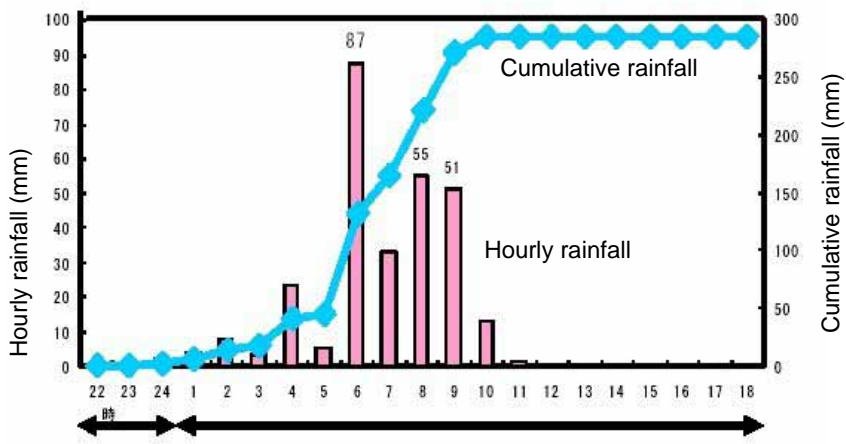
1. Meteorological phenomena and precipitation

Aspect of the meteorological phenomena of 18th of July

Baiu-front¹⁾ extending from Japan Sea to Hokuriku district (Fukui Prefecture) became active, and thick nimbus clouds covered Hokuriku District of Fukui Prefecture. It rained heavily especially in Reihoku area of Fukui Prefecture from the dawn of 18th until noon. Miyama Town had the record amount of rainfall 285mm in total from the beginning of rainfall.



Radar rain gauge



¹⁾ Baiu-front: Stationary front from May until July, there is a high-pressure mass of cold air above the Sea of Okhotsk to the north of Japan, while over the Pacific Ocean there develops a high-pressure mass of warm, moist air. Along the line where these cold and warm air masses meet, known as the baiu-zensen, causes prolonged periods of continuous rainfall.

2. Flooding situation

2.1 Rivers

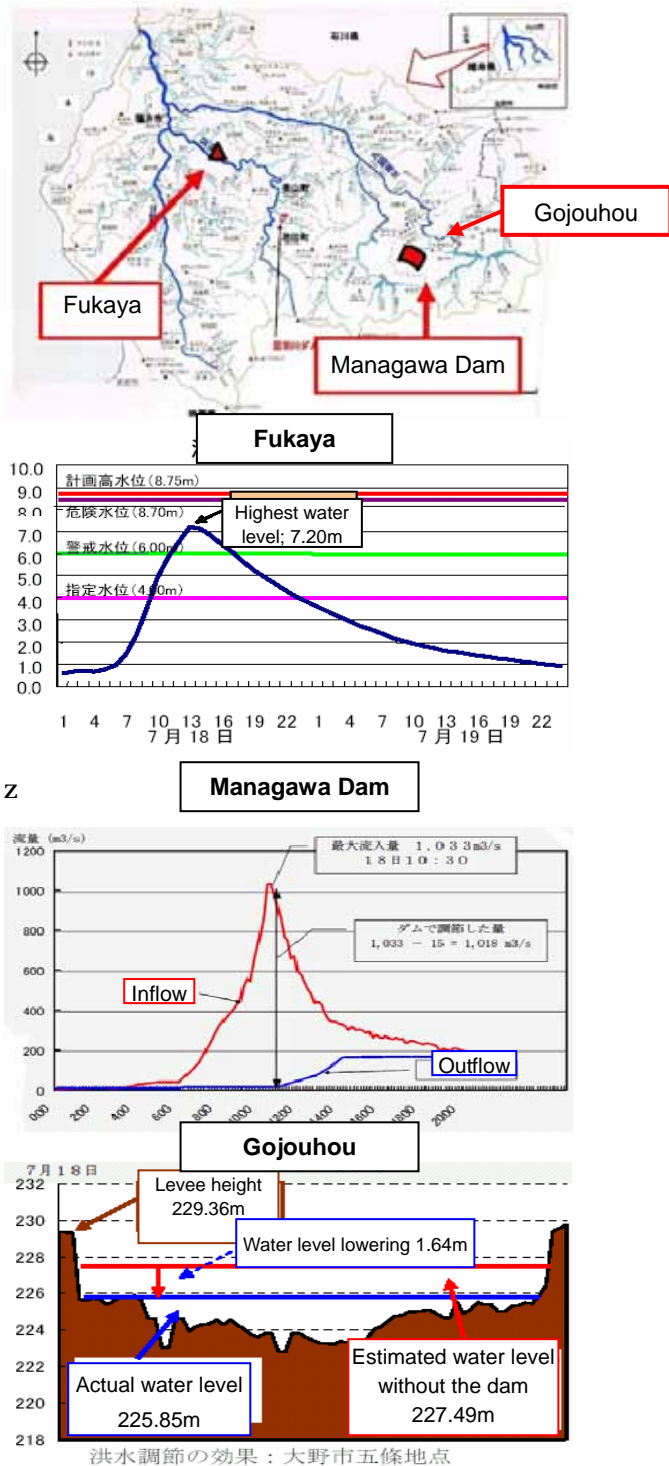
At Fukaya water gauge station, planning point for flood control of the Hino river in the Kuzuryu River system, the water level reached the dangerous water level²⁾ (4.00m) at 10:00 of 18th July, surpassed the warning water level³⁾ (6.00m) at noon, and recorded the peak (7.20m) at 13:00.

2.2 Dams

Managawa dam of the Mana river, feeder tributary stream at the upstream of the Kuzuryu River, recorded the largest inflow, 1,033m³/s at 10:30 of 18th. This was the biggest flood since the Managawa Dam was completed and started its operation in 1979.

- Effect of Dam

The dam regulated flood flow and the difference between inflow and outflow was about 1,000m³/s at the maximum, and it lowered the water level of the downstream.



Without the dam, it is assumed that the water level might have reached just 1.87m below from the levee crest at Gojohou in Ono city (The highest water level recorded: was 2.35m at 16h00 of 18th).

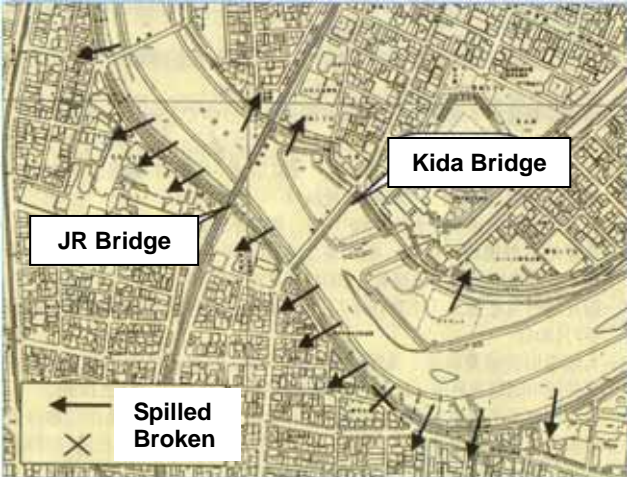
The dam contributed to bring the water level down by about 1.64m.

²⁾ Advisory water level: When a water level exceeds a designated water level, flood fighting team would start to prepare for deployment

³⁾ Warning water level: When a water level exceeds a warning water level, precautions should be taken along the river. Flood fighting team would start their activity.

3. Damages

Most damage of Fukui torrential rain was caused by water spilled from a levee or flow from a broken dyke. Especially, the heaviest rain in the recent years caused flood near the JR Bridge and the Kida Bridge in Fukui city, and brought about a lot of damage in the city (According to the analysis by the urgent research of Japan Society of Civil Engineers in July, 2004, the decrease of cross-sectional area by bridge piers is assumed to be the cause of the spill and the dyke break).

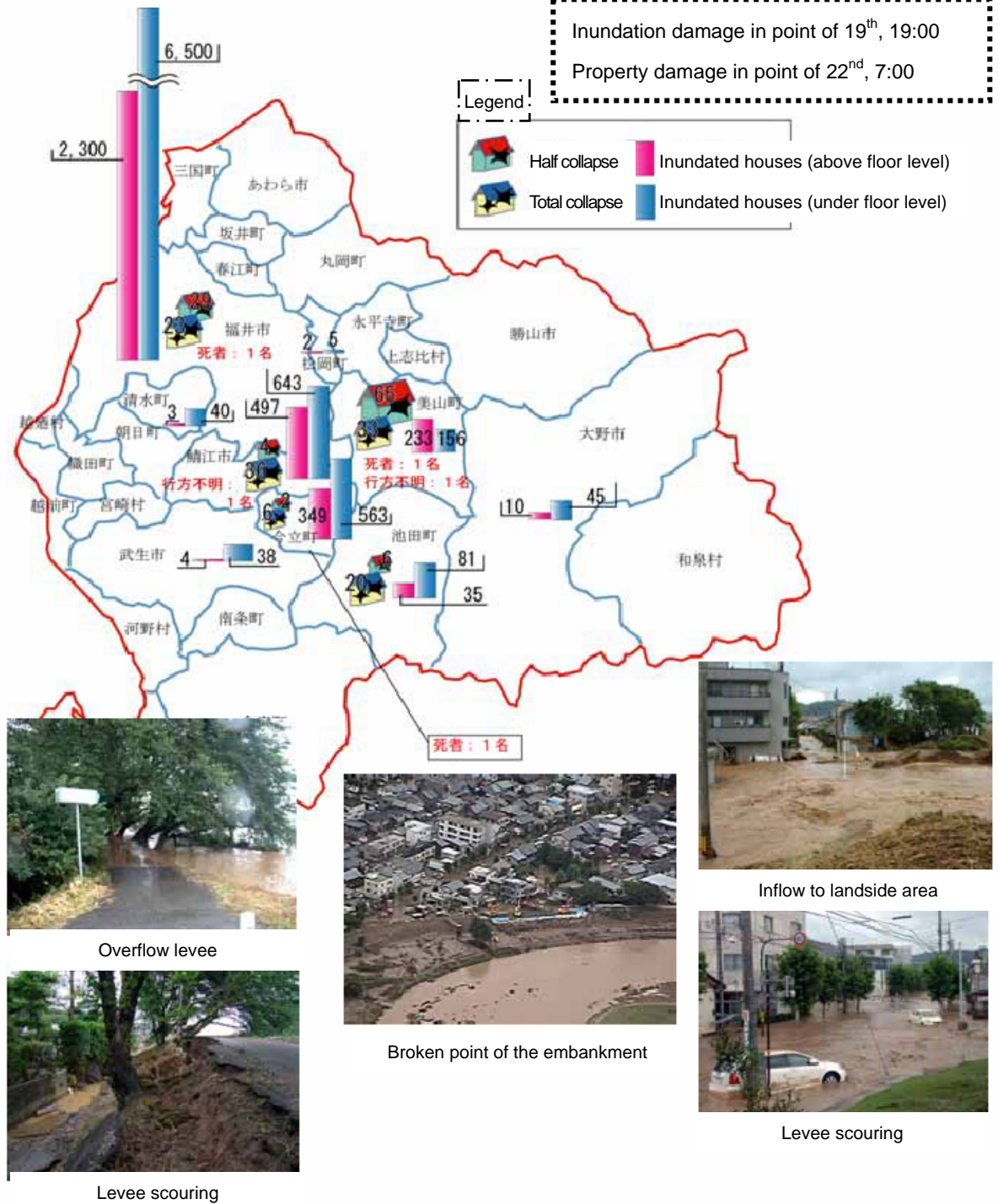


Spots of the spill from the levee and the levee failure.at JR bridge and near Kida bridge

Damages	<ul style="list-style-type: none"> Personal injury <ul style="list-style-type: none"> Deaths: 3 Missing: 2 Seriously injured: 4 Lightly injured: 13 Material damage <ul style="list-style-type: none"> Destroyed houses: 69 Half destroyed or damaged houses: 140 Damaged houses in parts: 99 Inundated houses(above floor level): 4,330 Inundated houses(under floor level): 9,842 Public damage <ul style="list-style-type: none"> Public building: 2 Others: 23
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3.1 Situation of damage by flood

水害発生状況



3.2 Situation of damage by erosion



Debris flow



Debris flow



福井市一乗谷川源流付近
崩壊箇所が複数見られる



Debris flow



Landslide



Sedimentation and floodwood



Landslide



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4. Restoration works



Shimizuchou, Katakasu : water leakage at the left bank of Hino River



Miyamachou, Oritate' s Asuwa River



Recovery



Dyke breaks (Asuwa River in Fukui district)