

# NON-LINEAR ANALYSIS OF DAMAGE TO THE SHIH-KANG DAM DURING 1994 CHI-CHI EARTHQUAKE

## 1994年の集集地震における石岡ダム被害の非線形解析

On 21 September 1999, the movement of Chelungpu fault resulted in M7.3 earthquake and produced a large scale ground surface rupture and deformation that damaged a lot of structures in the fault area. Locating on the fault trace, Shih-Kang dam was directly hit under its foundation resulting in severely damage. To prevent the future damage from this kind of situation, it is important to understand the behavior of the dam under the fault movement action. This study employed AEM as a tool for analyzing the failure behavior of Shih-Kang Dam.



Figure 1. Damage on the infrastructure in the Shih-Kang area [1]

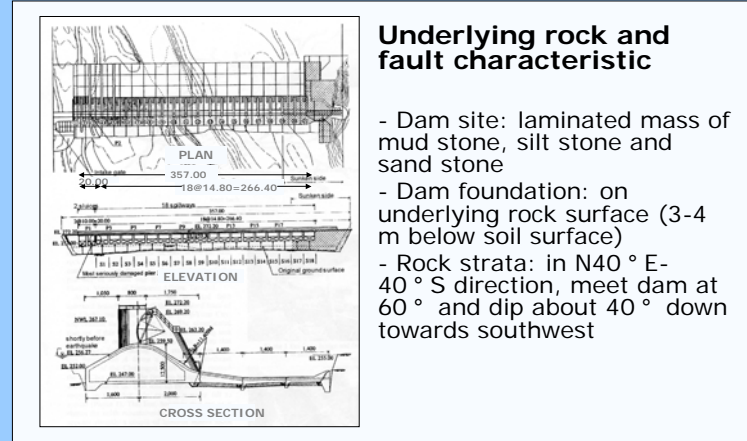


Figure 2. Shih-Kang dam geometry [2]

### Input displacement

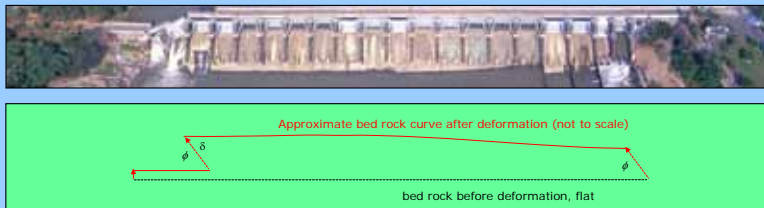


Figure 3. Input displacement

### Nonlinear analysis

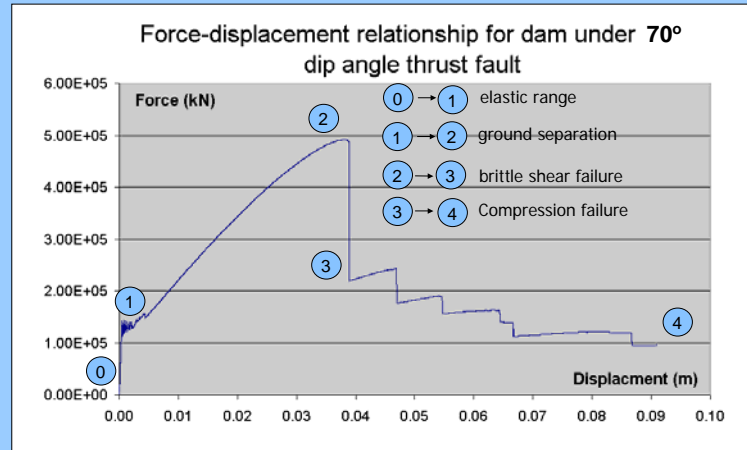


Figure 4. Force-displacement relation from non-linear analysis at the base of the dam from AEM

### Damage on Shih-Kang dam



Figure 5 damage just above the fault

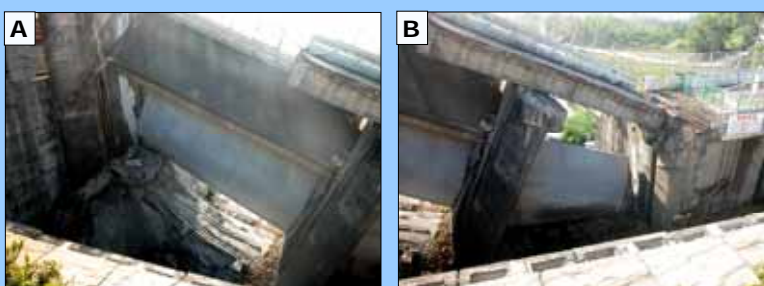


Figure 6 damage just above the fault after water draining

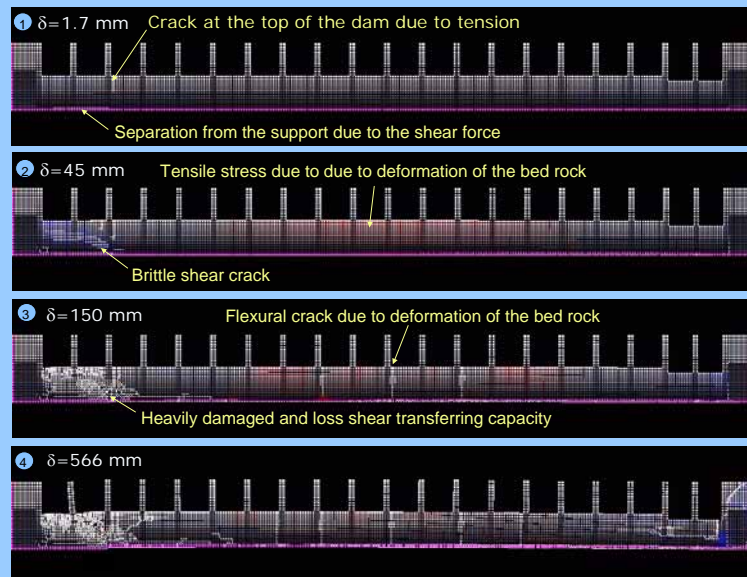


Figure 7 Crack pattern obtained from AEM

