

Research Topic: (1) structural safety under near-fault and/or multiple hazards (earthquake, wind, flood, fire, etc.) threat, and disaster mitigation strategies for improving resilience

NAR Labs

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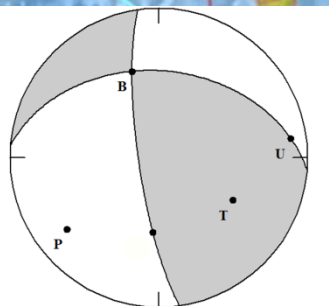
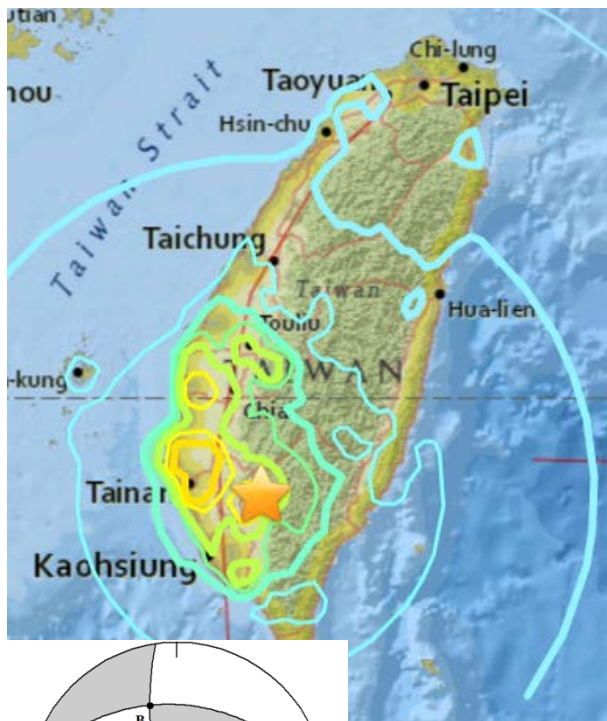
Understanding Near-Fault Ground Motions from Recent Large Earthquakes

Chun-Hsiang Kuo 郭俊翔

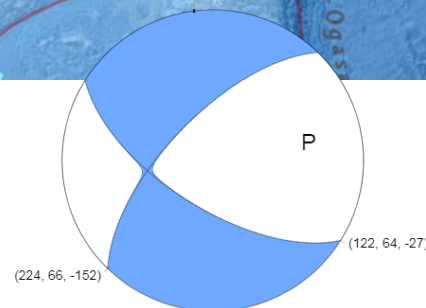
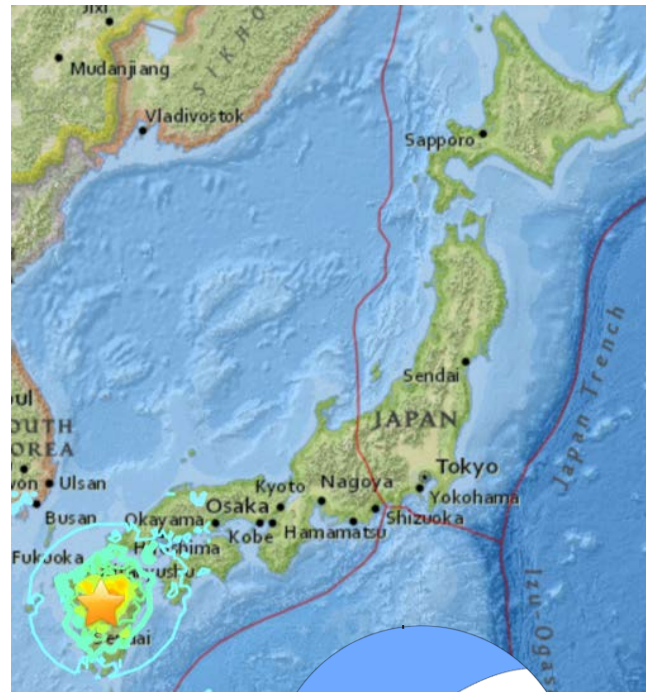
Research Fellow, National Center for Research on Earthquake Engineering

Large Earthquakes in 2016

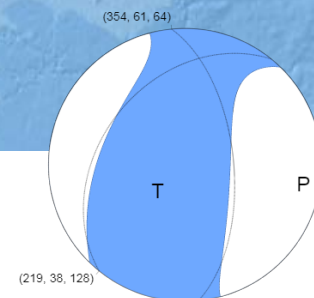
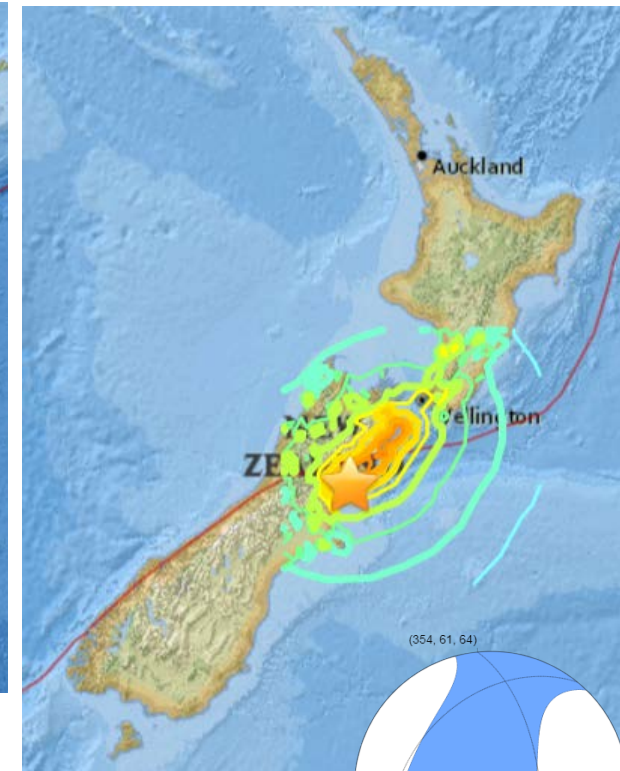
Meinong
Mw 6.5

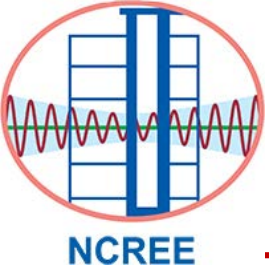


Kumamoto
Mw 7.0



Kaikoura
Mw 7.8

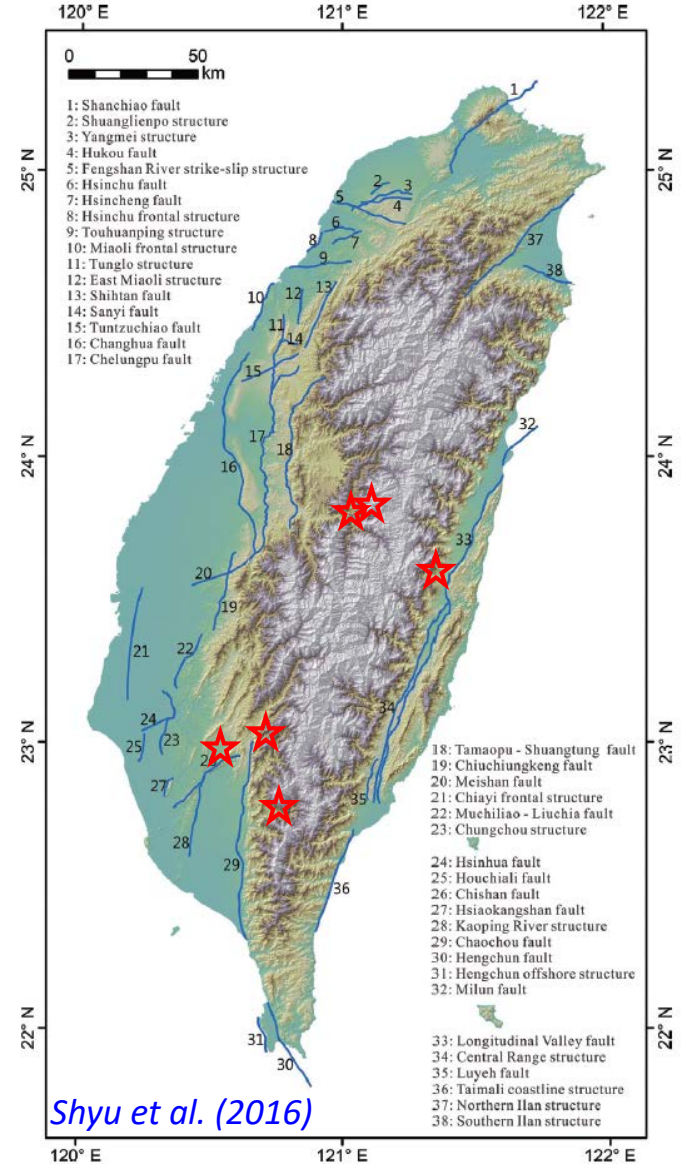
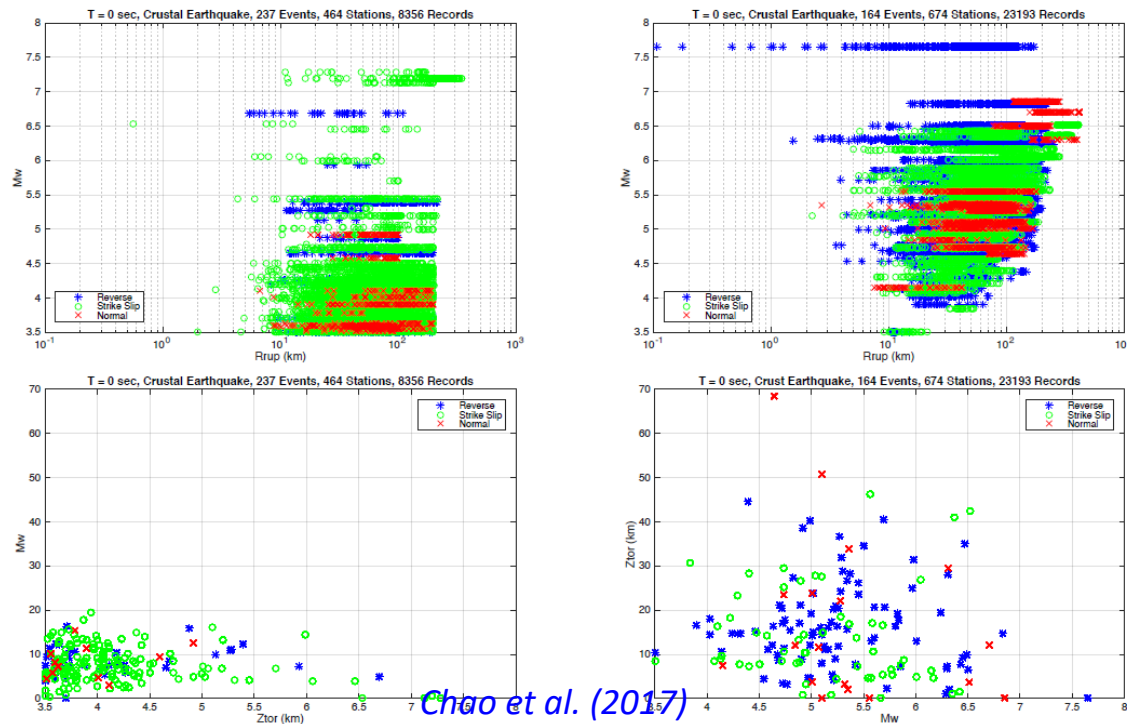
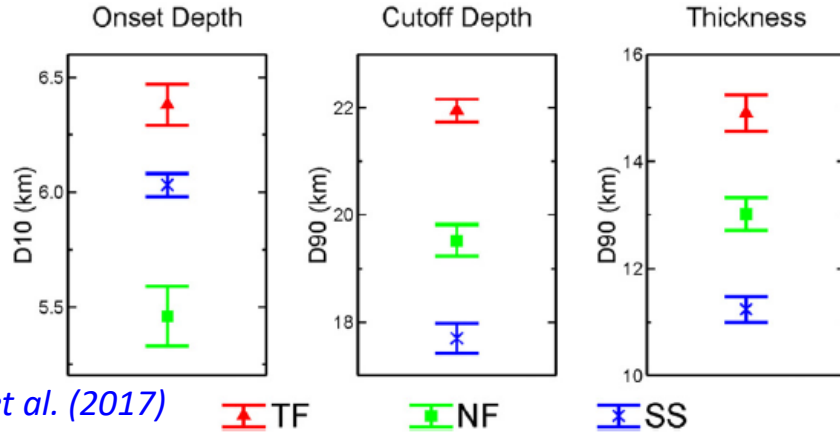




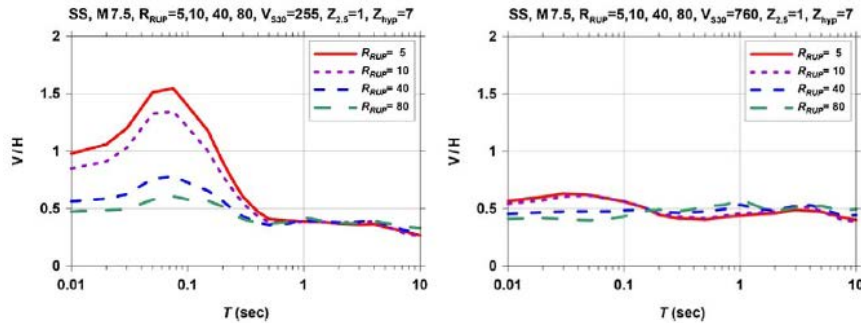
Three Important Issues

- **Blind faults is a significant issue in Taiwan**
 - 2010 Jiashin, 2012 Wutai, 2013 Nantou sequence, 2013 Ruisui, and 2016 Meinong
- **Vertical motion should be considered cautiously**
 - Vertical motion should not just be consider as $\frac{2}{3}$ of horizontal motion in near-fault region.
- **Effect of multiple velocity pulses on structures**
 - Effect of multiple velocities on structures should be studied.

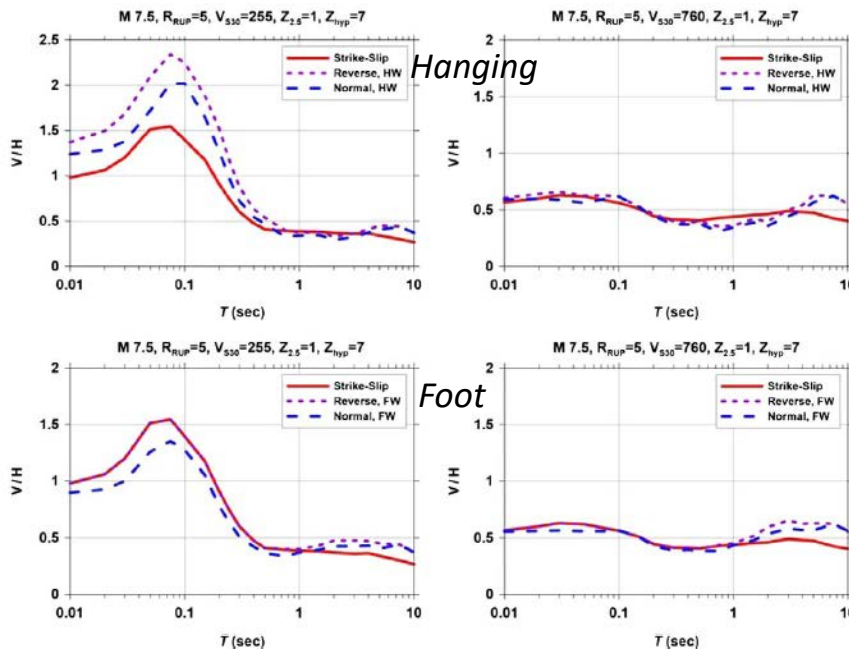
Blind Fault Earthquakes



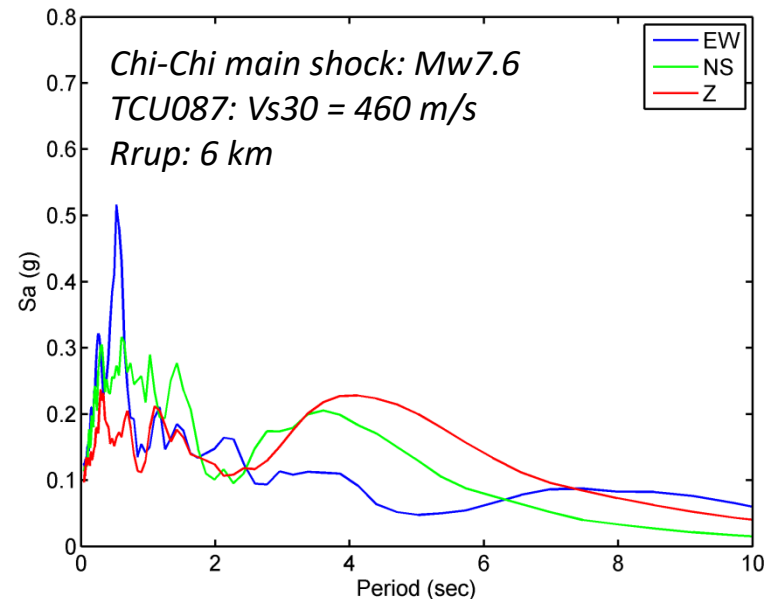
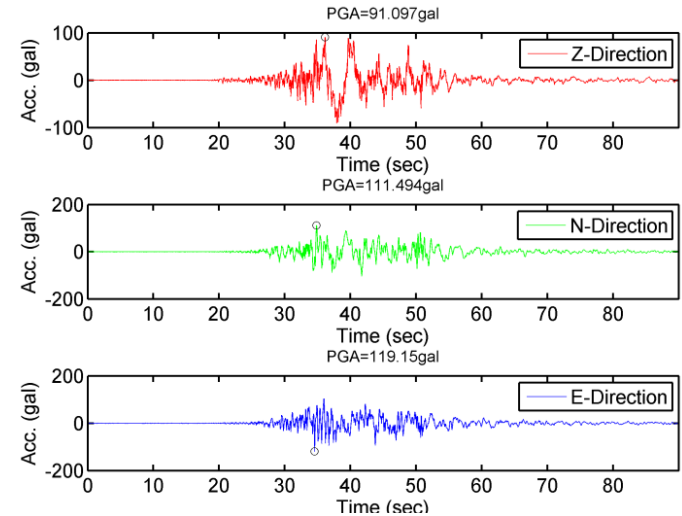
Vertical Motions



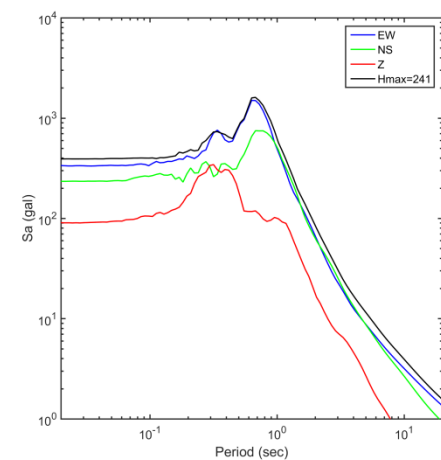
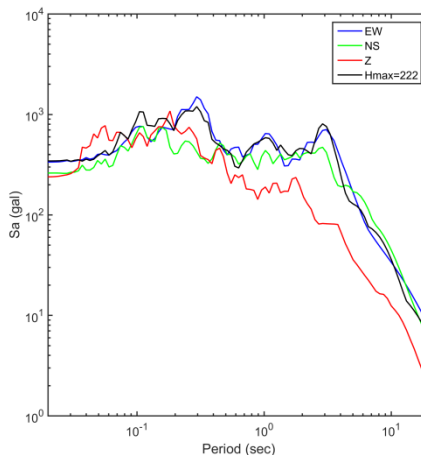
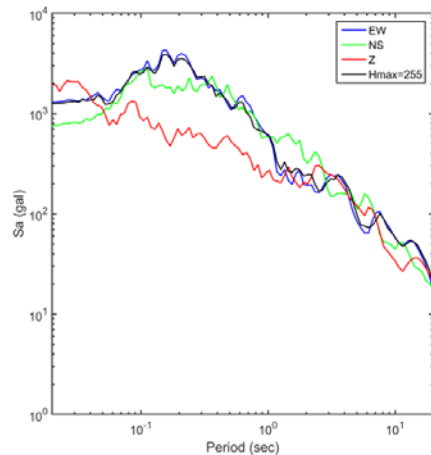
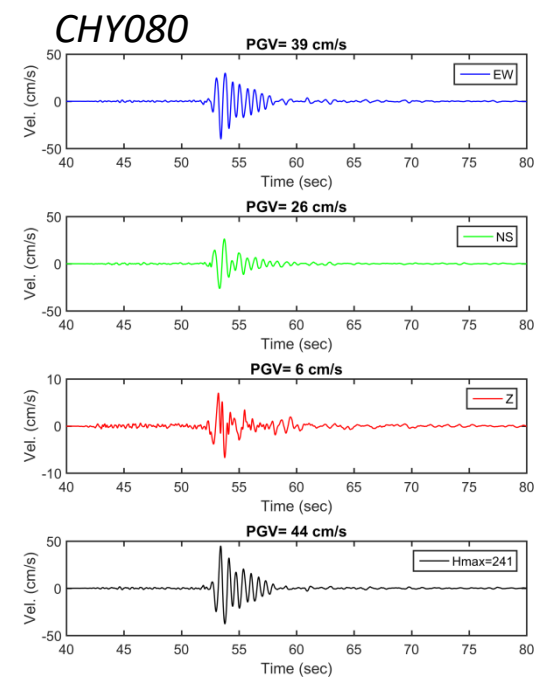
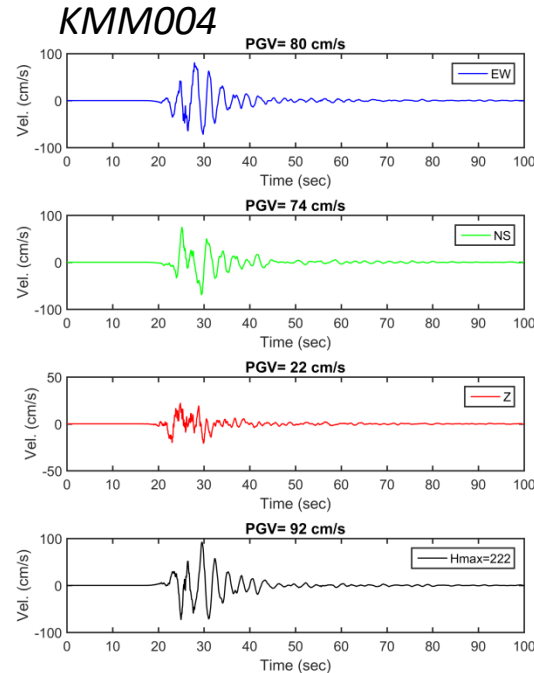
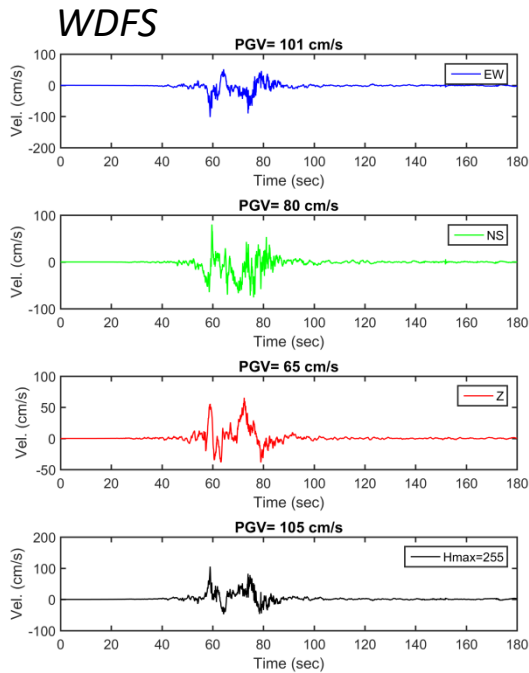
Scaling of V/H with distance for soil and rock sites.



Effect of style of faulting on V/H for HW and FW sites and for soil and rock sites. [Borzorgnia et al. \(2016\)](#)



Multiple Velocity Pulses



What we want to do

- **Blind Faults**
 - Long-term investigation, monitoring, and study cooperating with other institutes are necessary.
 - How to consider blind faults in PSHA?
- **Vertical Motions**
 - Important for floor and suspended structures.
 - Near-fault and soft soil sites have to consider the issue.
 - Regional specialty?
- **Multiple Velocity Pulses**
 - Complicated source, soft site, and topography may be the major reasons.
 - How's the effect on structures?

Thanks for your attention!!

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