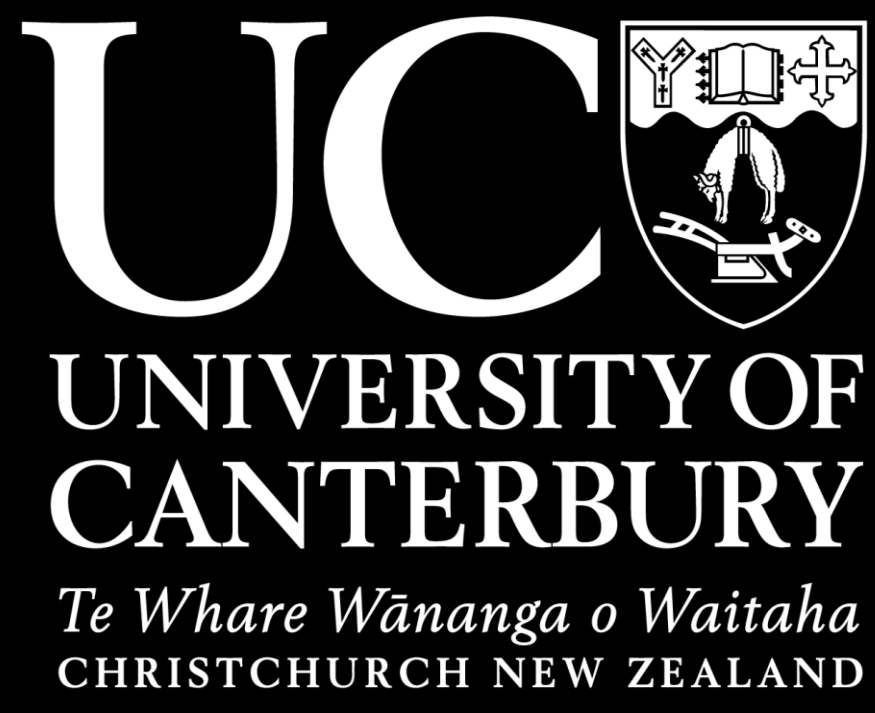


# A DIAGNOSIS OF STATE HIGHWAY ORGANISATIONS' DECISION-MAKING DURING EXTREME EMERGENCY EVENTS

Andre Dantas, Sonia Giovinazzi, Frederico Ferreira & Erica Seville

Resilient Organisations Research Programme

Department of Civil and Natural Resources Engineering



## Quality of Decision Making

### Decision Domains

#### Physical Domain

$(D_P)$

optimisation of the actions to ensure that the road network is able to function to the fullest possible extent

#### Information Domain

$(D_I)$

degree of connectivity achieved between the decision makers and the quality of the information exchanged.

#### Cognitive Domain

$(D_C)$

decision maker's knowledge, capabilities, techniques, and procedures

#### Social Domain

$(D_S)$

responsiveness to the needs of emergency management agencies and the technical advice provided

### Multi-Criteria Analysis

$$DM = \sum_{d=1}^4 \gamma_{d*} \left( \sum_{j=1} \beta_j * F_{jd} \right)$$

$\gamma_d$  is the normalised weight of the decision domains  $d$ ;  
 $\beta_j$  is a normalised weight associated to each success indicator  $j$ ;  
 $F_{jd}$  is the degree of fulfilment of the success indicator.

## Case studies

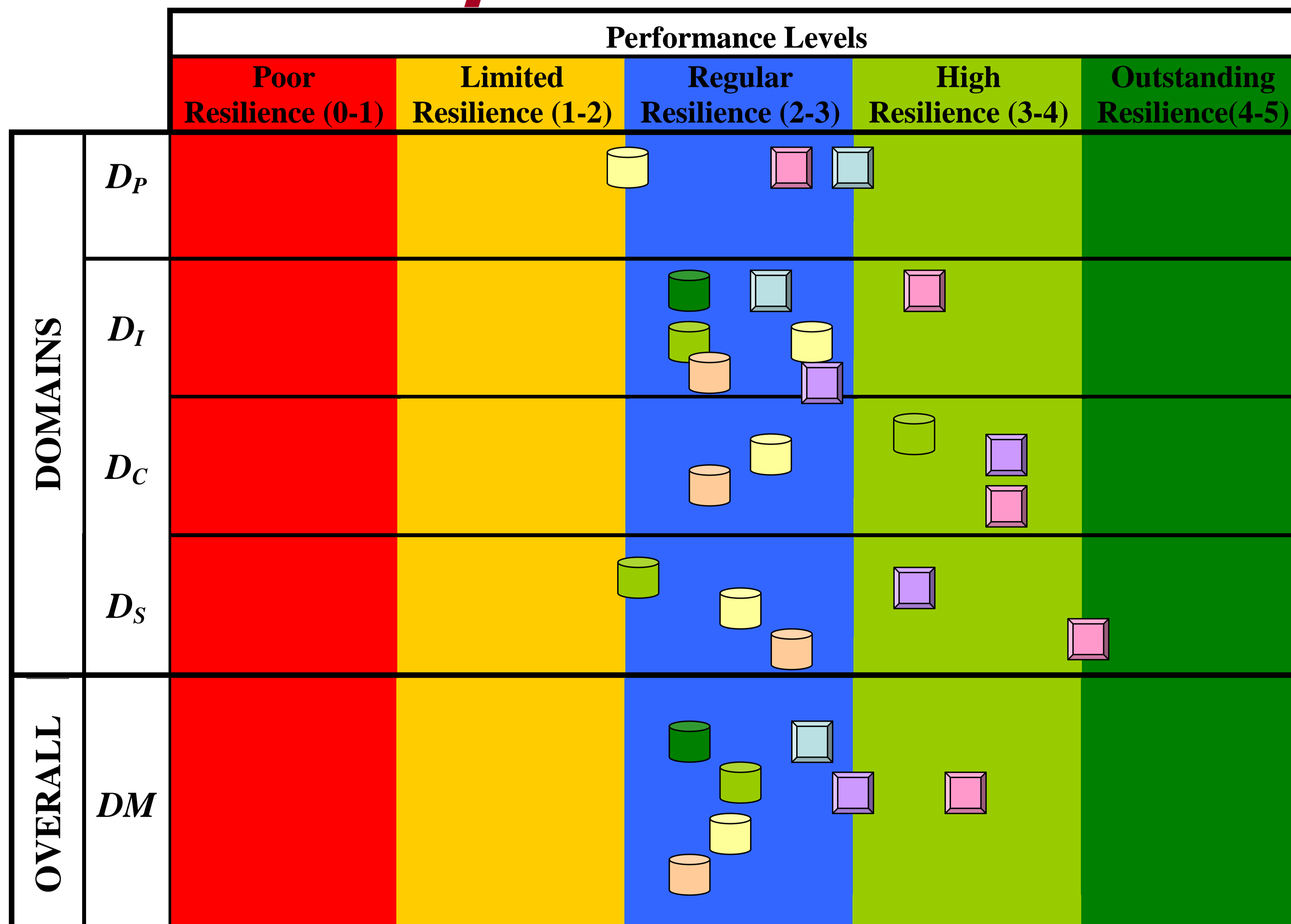
### Simulation Exercises

- MARCONI (Tropical Cyclone), Auckland, 2007.
- Icarus (Earthquake), Wellington, 2007.
- Capital Quake (Earthquake), Wellington, 2006.
- Ruauumoko (Earthquake), Auckland, 2008.

### Real Events

- Mount Ruapehu (Volcanic Eruption), North Island, 2007.
- State Highway 1 (Floods), Kaikoura, 2008.
- State Highway 2 (Floods), Matata, 2005.

## Analysis of results



## Conclusions

- SHO are capable, experienced and competent in dealing with major disruption or crises.
- SHO have achieved High and Regular levels of resilience in terms of decision making activities during emergency response events and exercises.
- SHO's major weaknesses in terms of decision making during emergency response are mostly related to resource allocation and information sharing

### ACKNOWLEDGMENTS

This research was partially supported by the Foundation for Research Science and Technology (FRST) of New Zealand. The authors would like to thank all NZTA, consultants and contractors who shared their knowledge and experience about emergency procedures and events.