

17th General Insurance Seminar

Risk and Reward



Institute of Actuaries of Australia

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Post Event Demand Surge

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Agenda

- What is demand surge?
- Why is it important?
- What is our approach?
- How can we use this framework?
- What are some things to consider?



What is demand surge?

- A component of post event loss amplification
- Inflation in prices as a result of the increase in demand for resources relative to supply in the market
- Demand > Supply → Inflated Prices
- Examples of demand surge:
 - Cyclone Larry (~20-30%)
 - Hurricane Katrina (~40%)
 - Victorian Bushfires??



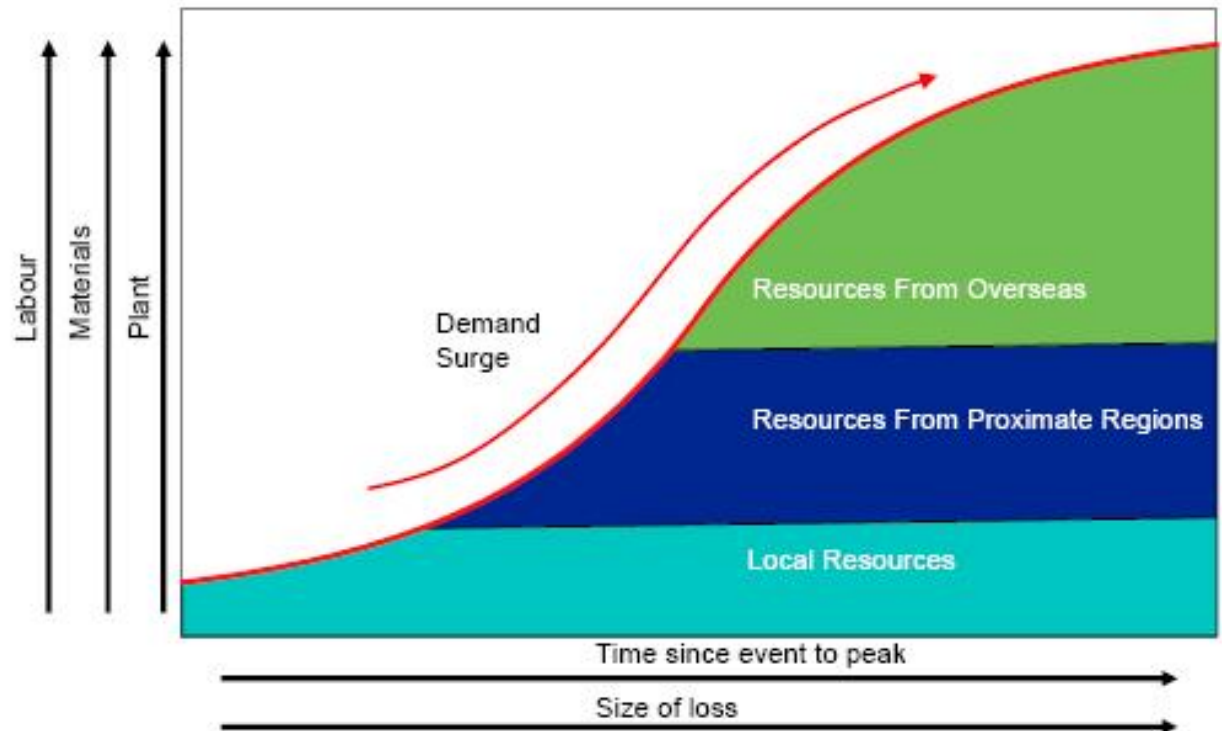
Why is it important to consider?

- Impacts key stakeholders:
 - Policyholders
 - Shareholders
 - Management
- Most models currently have limited capacity in dealing with demand surge
- Ratings - S & P requires the inclusion of demand surge when calculating its cat risk capital charge
- Regulatory requirements – APRA Capital Review



Sources of demand surge

- Labour
- Materials
- Plant
- Location
- Economy
- Services



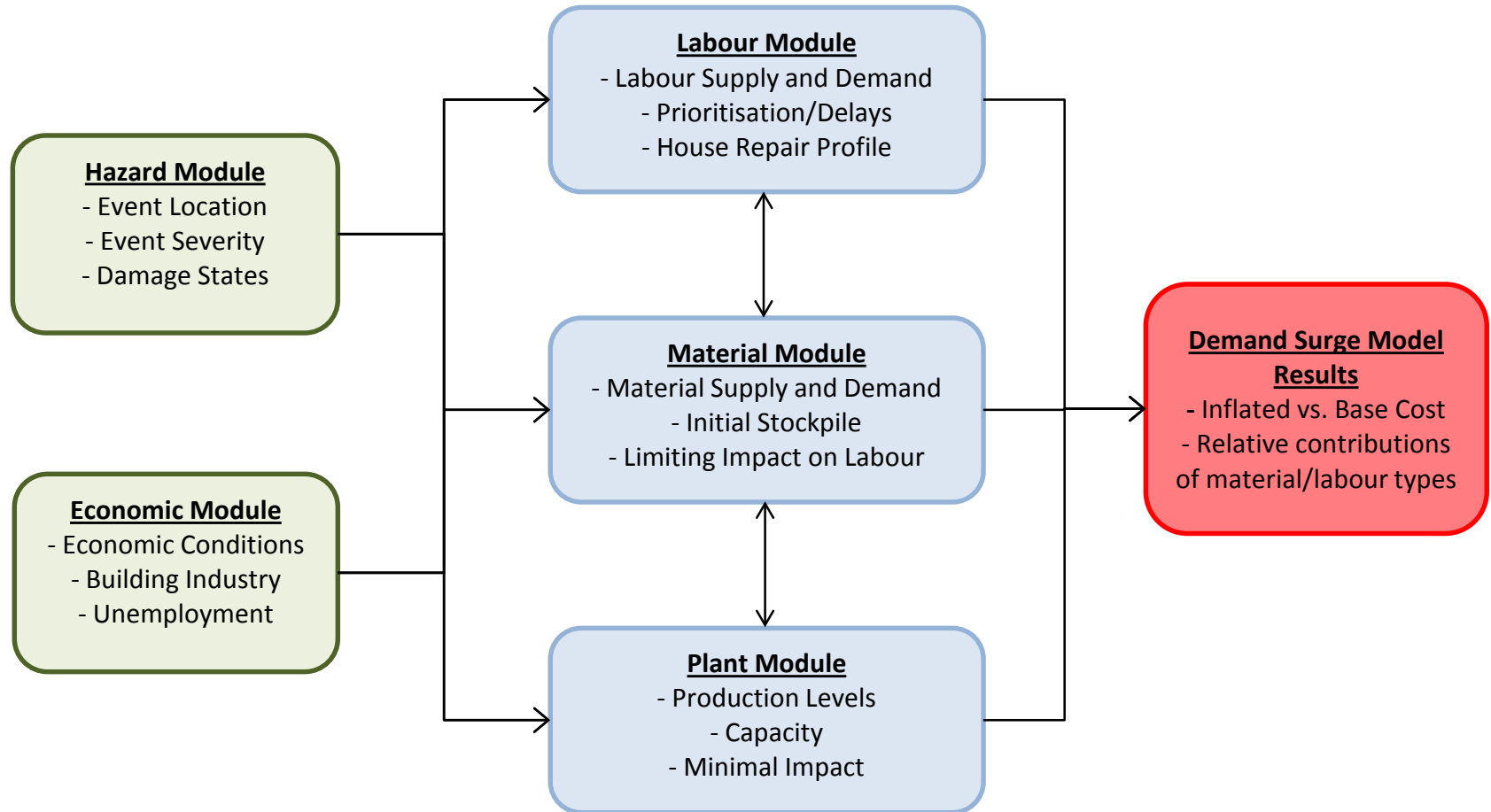


Our approach

- Initial focus on NZ earthquake events and impact on Residential losses
- Detailed ‘bottom up’ modular approach
- Demand and supply of:
 - Labour occupations (e.g. plumber)
 - Materials (e.g. bricks)
- Uses a weekly time step process
- Data sourced from EQC, Statistics NZ, Rawlinsons, Branz and RBNZ



Our approach

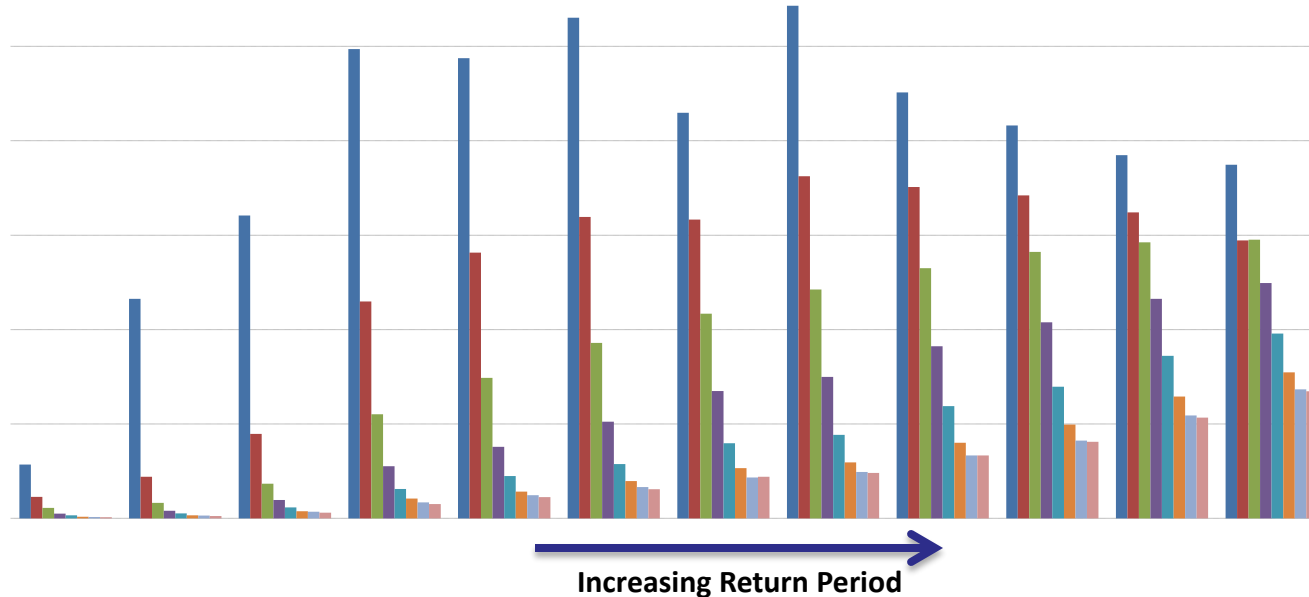




Hazard module – Damage states

- Segmenting damaged properties
- Distribution of dwellings at varying return periods

Damage State Distribution - Wellington Events

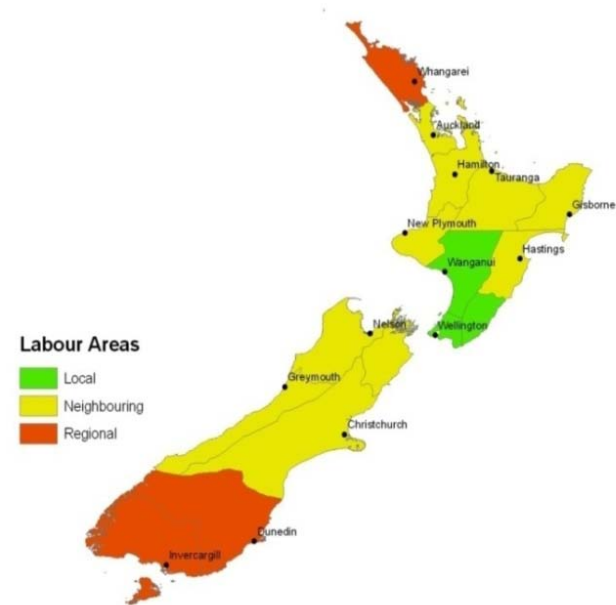
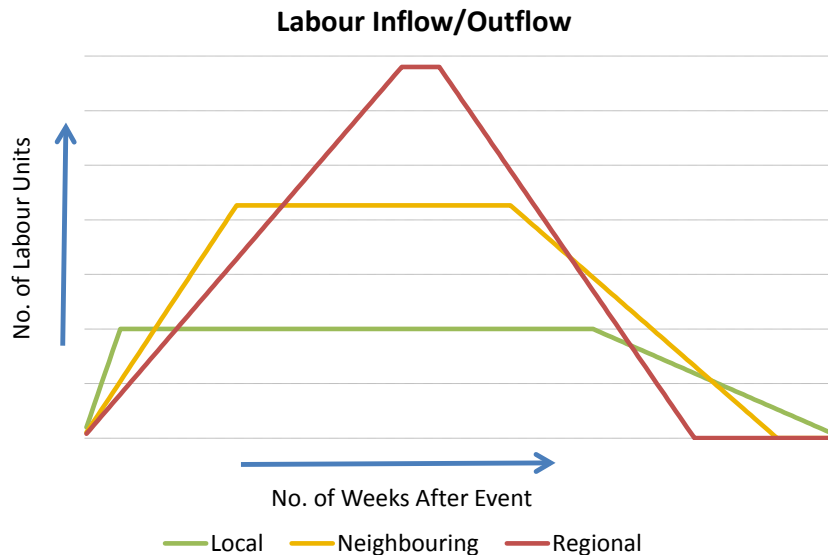


1 - Very-light 2 - Light 3 - Light-moderate 4 - Moderate
5 - Moderate-heavy 6 - Heavy 7 - Partial-collapse 8 - Rebuild



Labour module – Supply from Regions

- Labour is attracted to the event location as the supply of local labour is exhausted
- Hierarchical inflow - Labour supply flows are defined via arrival and departure profiles



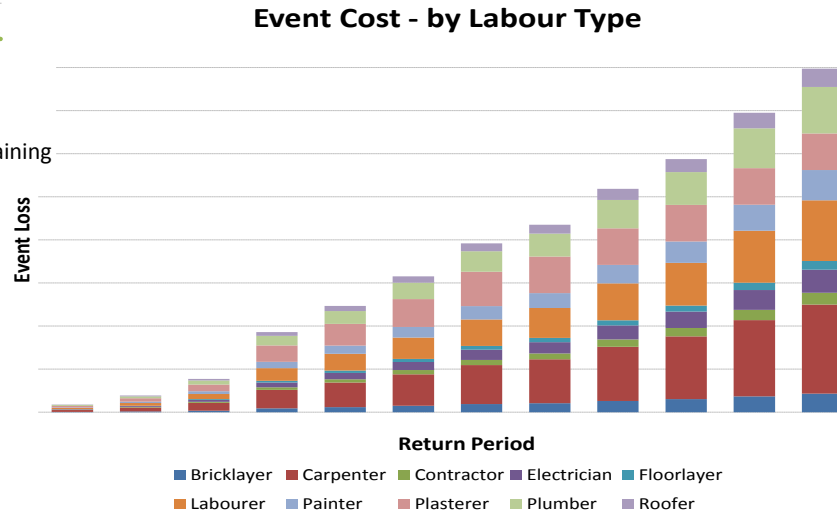
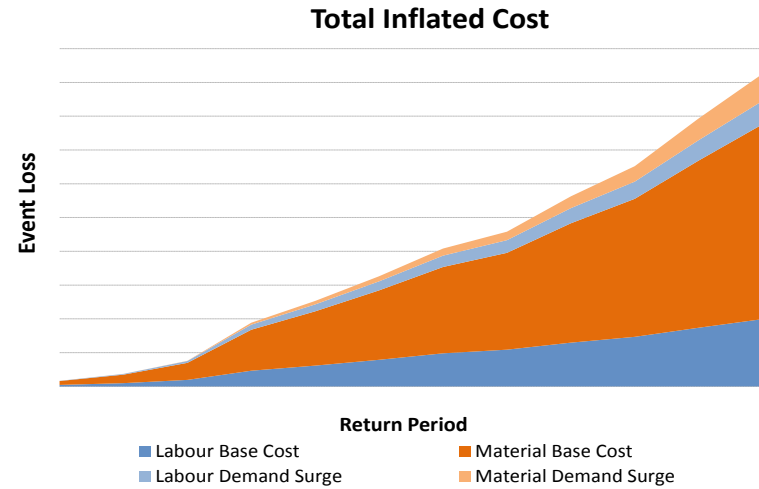
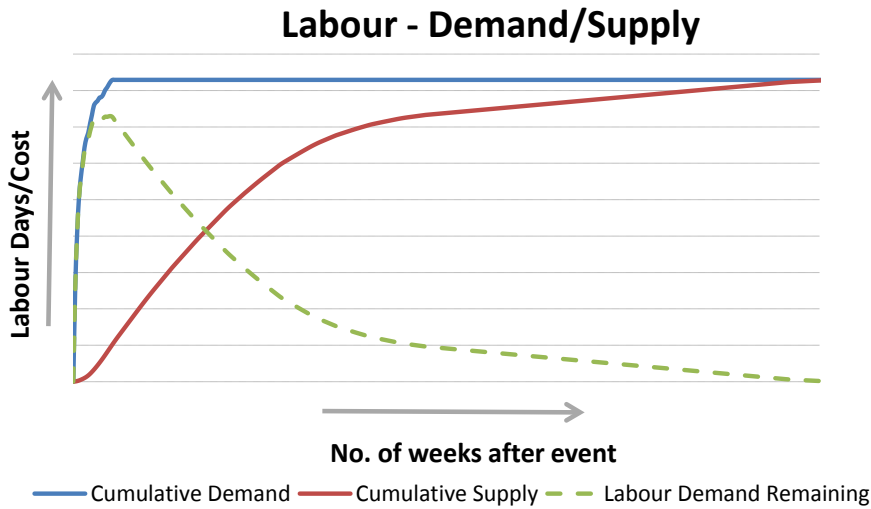


Labour – Time Step Process

	Weeks after event									
	1	2	3	4	5	6	7	8	9	10
Incoming Demand	25	50	75	100	100	75	50	50	0	0
Previous Remaining Demand	0	0	25	75	125	175	200	175	150	75
Demand	25	50	100	175	225	250	250	225	150	75
Incoming Supply	25	0	0	25	0	0	25	0	0	0
Available Supply	0	25	25	25	50	50	50	75	75	75
Supply	25	25	25	25	50	50	50	75	75	75
Demand Satisfied = Supply	25	25	25	50	50	50	75	75	75	75
Remaining Demand	0	25	75	125	175	200	175	150	75	0



Model outcomes





Other considerations

- Allowances for commercial, industrial and infrastructure demands
- Economic conditions
 - Economic cycle will affect labour supply
 - Currency fluctuations affect import price
- Government intervention
 - Allocation of resources to high priority repairs
 - Caps on material prices



Darfield Earthquake

- Currently collecting data to calibrate the model
- Early Observations
 - The delay on reconstruction is considerable
 - Community spirit is key to cost mitigation
 - EQC management will be critical to demand surge mitigation
 - Resources are already arriving in Christchurch