

TESTING WUI-NITY: THE PLATFORM TO MODEL WUI FIRE EVACUATION

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The world has seen many intense wildfires in recent years than ever before. When these wildfires extend to a populated wildland-urban interface (WUI) area, lives and properties of the residents are in danger. Thus, to protect the WUI communities from such deadly hazards, it is important to issue a timely evacuation order. Moreover, the way a WUI community responds to an evacuation order can significantly affect the outcome of a WUI fire. With these in mind, the study attempts to test the modelling capability of the WUI fire evacuation tool WUI-NITY.

The WUI-NITY platform is capable of simulating the dynamic conditions during an evacuation by coupling wildfire spread, pedestrian movement and traffic movement layers. The platform is a recently introduced and freely available tool to model WUI fire evacuation. In order to test WUI-NITY, the study made use of the data collected from an evacuation drill conducted in Roxborough Park community (Colorado, US). Considering the conditions in the drill as the base, a default scenario was constructed. This scenario then served as a benchmark to construct another 15 scenarios. The scenarios differ from each other depending on the values assigned to five selected variables. The variables are – total population, response time of people, availability of different goals as a safe area, limiting the capacity of this safe area, and the activation of a lane reversal order. The scenarios are then simulated in the WUI-NITY platform to produce quantitative results for a vulnerability assessment.

One of the interesting findings of this study is the influence of response time. The resulting total evacuation time and the evolving conditions during the evacuation are largely influenced by the response time of the evacuees. When people responded within a short period, it took them less time to evacuate to safety, enabling them to leave the threatened area swiftly. Moreover, despite the large inflow of vehicles due to quick response, the roads were not congested. This implies that the road network of the community has enough capacity. On the contrary, when people responded late to the order, the total evacuation time increased significantly. In this case, there is a little chance of congestion in the roads, as the vehicles enter the road network over a longer period. Furthermore, results from the scenarios present evidence that the dynamic condition during the evacuation is of more interest than just reporting the total evacuation time.

The platform is still on its development stage. A proper validation is required for the better use of this tool to simulate WUI fire evacuation. This study can be considered an initial step towards this task. WUI-NITY can be useful to educate the WUI community residents about their responsibilities during such incidents. Additionally, incident managers and emergency responders can also benefit from using the tool, by planning a safe and timely evacuation before and during an incident.