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How to address model uncertainty in the escalation of domino effects?

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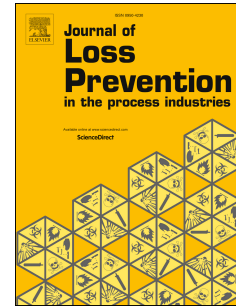
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# 1    **How to address model uncertainty in the escalation of domino effects?**

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## 15    **Abstract**

16    Modeling potential domino scenarios in process plants includes the prediction of the most probable  
17    sequence of events and the calculation of respective probabilities, so-called escalation probabilities,  
18    so that appropriate prevention and mitigation safety measures can be devised. Domino effect  
19    modeling, however, is very challenging mainly due to uncertainties involved in estimation of  
20    escalation probabilities (parameter uncertainty) and prediction of the sequence of events during a  
21    domino effect (model uncertainty). In the present study, a methodology based on dynamic Bayesian  
22    network is developed for identification of the most likely sequence of events in domino scenarios  
23    while accounting for model uncertainty. Verifying the accuracy of the methodology based on a  
24    comparison with previous studies, the methodology is applied to model single-primary-event and  
25    multiple-primary-event domino scenarios in process plants.

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28    **Keywords:** Domino effect; Oil terminal; Dynamic Bayesian network; Model uncertainty; Graph  
29    theory.

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