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خلاصه مقاله:

The study of factors influencing the performance of PE pipe against rapid crack expansion is of great significance for the safe use of PE pipe. This paper analyzes the role of each step in the algorithm based on the theoretical basis of random forest, and proposes an improved random forest method based on recursive feature elimination by changing the node splitting rules to address the shortcomings of the random forest classification accuracy. The method is used to analyze the effect of rapid crack expansion of PE pipe in terms of pipe size and wall thickness, impact knife speed, and notched impact strength of simply supported beams. Under the same conditions, the extended crack lengths of DN۲۶۰, DN۱۵۰ and DN۶۵ pipes are ۱۹۷, ۱۶۴ and ۱۲۸ mm, respectively, while the crack lengths of PE۸۰ pipes are ۲۴, ۲۱۰ and ۲۳۹ mm at impact knife speeds of ۱۰, ۱۵ and ۲۰ m/s, respectively. The higher the notched impact strength of the simple beam, the higher the critical pressure value and the better the RCP resistance. The study of rapid crack expansion of PE pipe based on deep learning algorithm can identify the main internal and external factors affecting the RCP resistance of PE pipe and provide a solid basis for PE pipe life prediction.

کلمات کلیدی:

prediction, Service life, Random forest, Elimination of Recursive Features Polyethylene Pipe, rapid crack expansion, critical pressure value

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