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P3.235 On scheduling methodology for large-scale R&D projects using TRL and critical chain and its application to fusion

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Large-scale R&D projects are experiencing frequent delays due to high development uncertainties. Schedule issues are creating a series of problems that are causing delays in the entire projects by increasing the cost of projects and thereby reducing the reliability resulting in delays in timely tasks such as building the R&D facilities. In this study, considering the fact that the technology readiness level is related to the development period of large R&D projects and that it can prevent the delay by buffering the activity with high schedule risk, we developed a scheduling methodology that computes a probabilistic distribution of large-scale R&D projects, buffers the project and prevents delay and facilitates project management. In the methodology, the elemental technologies of the target system are searched and the development time, technology readiness level, and schedule risk level are evaluated by experts. Next, probabilistic delay is calculated using the Monte Carlo method. When the basic schedule is determined by taking into consideration the post-assembly relationship of the final system calculated for each activity, the difference between the basic schedule and the first schedule from which the spare time is removed is compared and the difference is stored in the buffer. In the case of a critical chain, it is put into the project buffer. In case of noncritical chain, it is set as a feeding buffer. Lastly, the calculated schedule is revised and supplemented by referring to the R&D device construction plan, which is a major constraint factor of large R&D projects. The validation of the methodology was made through comparison of simulated data and the KSTAR project data. Based on the validation result, an application for scheduling DEMO project is presented.

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