

Abstract

For over 50 years, network analysis techniques have been the basis for project planning and scheduling in the engineering and construction industry. Originally, network analysis was acclaimed as a triumph that it was predicted would realise significant improvements in project time and cost performance; however, major engineering and construction projects continue to suffer significant schedule overruns. This research, aims to establish if network analysis techniques have proved effective and lived up to their early promise and began with a comprehensive literature review that delivered a synthesised history of network analysis. This formed the basis for semi-structured interviews with 13 experienced UK-based senior planning and scheduling practitioners from 11 companies in engineering and construction industry. The results suggest that that network analysis techniques are beset with people and behavioural issues at all levels. Examples include lack of interest by top management, gaps in knowledge of network analysis techniques on the part of project managers and key project team members, the absence of clear responsibility for ownership of the planning function and conflict over the project schedule. This is compounded by a chronic planning engineer skills shortage that compromises the potential benefits of project management software. The practice of hand-drawing the project network before data entry into the planning and scheduling software is now rare and one effect of the skills shortage is that the software has not realised its full potential. This study demonstrates that external planning standards from industry and professional bodies are consistent and available, but awareness and use of this material is limited. Despite these issues network analysis is found to improve project management, acting as an instrument that promotes effective project team collaboration and understanding of project scope, ensures good project schedule visibility and provides an early warning system of adverse trends. However, all of these benefits were evident over 40 years ago. The practitioners that participated in this research consider that without network analysis the situation would be worse. Nevertheless, network analysis has stubbornly refused to deliver the more tangible benefits, such as the elusive improvements in project schedule performance. Finally, the research presented here suggests that the high praise and early promise of network techniques at the beginning of the 1960s has not been realised in practice.

Keywords: CPM, PERT, Critical Path, Network Techniques, Planning, Scheduling, Engineering, Construction, Project Management, Software