

Railway infrastructure engineering in the wild

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Abstract

Classical decision theory is supported by laboratory studies in which participants are charged with selecting between known alternatives with fixed aims, purposes and values. Such work supports the assumption that decision makers weigh up the relative merits of competing options to make an optimal choice. In the wild however the costs and benefits of competing options are ill defined, and real time, high stake decisions are based on experience, pattern matching and parsimonious analyses of rich data streams. The following case study highlights some of the patterns and complexities of real time railway track renewal work in the UK.

Background

The UK rail infrastructure dates back to the Victorian era and an extensive programme of track maintenance and renewal is necessary to preserve the integrity of the network. The decision to renew a section of track and associated assets is taken when routine maintenance becomes ineffective or when qualitative upgrades are required to support increases in line speed or in the intensity of use.

The work presented here is a case study of the renewal of a short section of track (approximately 1400 yards, or 1.2 kilometres) on a busy UK commuter route. The renewal was planned a year in advance with line blockages, isolations and possessions spread over 13 weeks and with approximately 93 track workers employed on the weekend of the observations. Track renewal work is therefore expensive and its complexity can be demonstrated by the scope of work for ergonomists, which ranges from information support for planners, on site manual handling and safety critical communication, to work organisation, supporting shared situation awareness and distributed team performance.

The work aimed to gain an insight into the patterns and complexities of track renewal work and produce a model of integrated rail operations (Bye et al, in press) to show how operators could be better supported in future to enhance safety, efficiency and productivity. This outline provides a snapshot of the work to give an indication of some features that contribute to the complexity of railway infrastructure renewals 'in the wild' (Hutchins, 1996).