

A simulation model to minimise operational conflicts on a single-track rail line

It has been observed that commuter trains serving Colombo during peak periods are crowded and the capacity is not adequate to meet the demand. Train schedules for the sub urban services are not uniform. As train scheduling is done manually, it difficult to reschedule the off peak operation to accommodate uniform headway. It is also not possible to accommodate service changes or a train cancellation without allowing for a chain reaction of long delays. As all trains, intercity, express slow and goods, share the same rail network, delays are experienced due to scheduling conflicts. Single-track situation and stations without siding facilities have added to these schedule conflicts.

This paper presents an attempt made to facilitate re-scheduling of trains to minimize operational delays on single track rail line subject to resource constrains such as locomotive availability, poor track conditions and stations without siding facilities. A computer simulation model designed to optimize train schedules on single-track lines is presented.

Four objects of array variables are used in the simulation process to keep train and station data. Two object arrays are used for the train movements in up and down directions. The stations' data are stored in the other two object arrays. One of these arrays of stations contains all the stations of the line while the other one contains only the stations with siding facilities. A case study that covers single -track rail line from Colombo Fort to Awissawella, with 14 stations is presented to highlight the model capabilities.