

Title Improvement of the grain elevator receiving operation by means of object-oriented simulation.
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Abstract

This paper investigates, by means of a simulation model, the option of enlarging the receiving pit holding capacity and dimensions to increase the throughput of the unloading operation for a country grain elevator. The model has been validated against the performance of a large Midwestern USA commercial grain elevator and has previously been used to verify the feasibility of different facility improvements. The parameter used to compare the performance of the different elevator configurations is the average service time per customer, expressed as the difference between the moments the truck enters and leaves the system. It includes all unit operation times and waiting times incurred by each truckload delivered to the grain elevator. Enlarging the pit size to simultaneously dump the two hoppers of a trailer carrying approximately 25 tonnes of grain without moving the semi truck back and forth would yield a 1.1 minute per truck time saving for each load. For the elevator surveyed, semi trucks represent approximately 80% of the total traffic. On a peak day, the enlargement of the existing two receiving pits would result in service times of approximately 32 minutes per load for the proposed elevator configuration versus 59 minutes per load for the present configuration. It would also reduce the truck cycle time per load for farmers, which would increase their daily crop harvesting capacities without their having to add additional transportation equipment. Consequently, the grain volume received at the elevator could be considerably higher with this modified configuration.