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The development of risk based technique for optimal spare parts inventory control in urea production plant

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The number of major losses and equipment breakdown due to unavailability of spare parts has gained increasing attention among maintenance and inventory planner. Traditionally the inventory planner will strengthen their replenishment policies in order to maximize the expected total profit and lowering total cost in planning horizon. Nevertheless, some of the inventory planners are risk neutral and they are willing to trade off the lower expected profit for disadvantage protection against possible production losses. Unfortunately this traditional inventory control deviated from meeting the needs of risk-averse inventory management. Moreover the previous model does not suggest a specific direction to reduce the unfavorable total cost from the perspective of spare part risk. Thus, it is important to incorporate the element of risk in a broad aspect of inventory control mechanism. This paper describes the development of risk quantification technique using Spare Parts Failure Probability Table for the plant inventory control. The table will provide the probabilities of four critical spare parts that has been identified by the maintenance planner. These probabilities can be used to quantify the risk for the spare part failure and later to produce optimization in terms of risk and finding the minimal inventory cost.

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