Mathematical Model for Cost and Damage Reduction in Supply Chain Network

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Abstract: Supply chain complexity and uncertainty of transportations hazards and weak packaging increases product damages during shipping. The most common hazards in transportation include shocks, vibrations, accident, handling, etc. However, proper packaging can prevent most of the damage from shocks and vibration. The loss due to damage at each stage of the supply chain network can be reduced by selecting the appropriate packaging type, transportation method and by shipping under assembled or unassembled condition. A mathematical model which minimizes the total costs (damage costs, shipping costs, and packaging costs) has been developed and programmed in MATLAB to find the best routes and packaging type to minimize the cost of damages in transit. The mathematical models were verified by using total enumeration strategy. Case studies to illustrate and validate the procedure were developed and implemented in MATLAB.

Keywords: Damage Cost, Shipping Cost, Transportation Disruption, Lean