

Inventory, Shortage & PO Delivery Optimization

A Power BI-ready materials-planning case study connecting stock position, service level and supplier delivery exceptions.

SUPPLY CHAIN & PROCUREMENT PORTFOLIO

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Portfolio note: This case uses realistic fictional data. It demonstrates my approach to structuring a business problem, defining measures and turning analysis into actions. No employer-confidential information is included.

Business question

A materials team was expediting shortages but did not have one view linking inventory position to purchase-order delivery. Buyers could see late POs, planners could see backorders, and managers could see inventory value - but the connection between those issues was not clear.

My objective

I built a model around material, inventory and PO-line data so the team could identify which shortages mattered most, which suppliers were driving delivery risk and where working-capital decisions could improve service.



Data model

- DimMaterial: ABC class, criticality, average demand, lead time, safety stock, reorder point and standard cost.
- DimSupplier: supplier profile and expected delivery performance.
- FactInventory: monthly opening, receipts, demand, fulfillment, backorders, closing balance and carrying cost.
- FactPOLines: order, promise and receipt dates, quantity, value, delivery status, days late and delay reason.

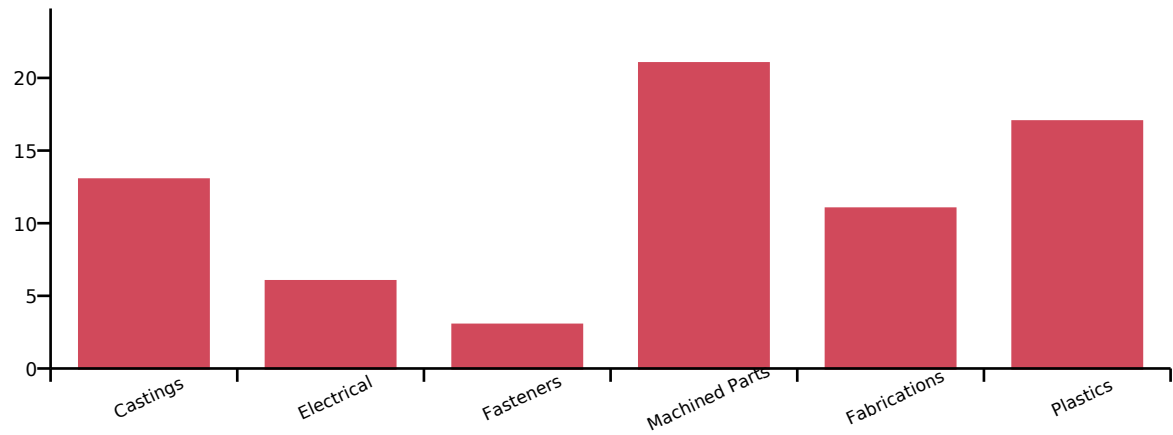
Tools and methods

Power BI model design, Power Query-ready tables, DAX measure definitions, ABC prioritization, fill-rate analysis, backorder valuation, PO delivery aging and delay-reason Pareto thinking.

What the data showed

98.0% OVERALL FILL RATE	81.7% PO ON-TIME DELIVERY	\$637K BACKORDER EXPOSURE	30 TOP DELAY: DOCUMENTATION
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Stockouts (events)



Three points stood out

- Overall fill rate was 98.0%, but the aggregate hid 71 material-month stockout events.
- Machined Parts was the most constrained category, with a 95.2% fill rate, 21 stockout events and \$218K in backorder exposure.
- PO OTD was 81.7%. Source Partner 03 was the lowest-performing supplier at 73.8% across 65 lines.
- Documentation was the most frequent coded cause among late lines, which points to a process issue that can be addressed alongside supplier recovery.

The key lesson was that a healthy overall fill rate does not mean shortage risk is under control. The exception view needs to focus on critical materials and financial exposure.

Recommended actions and dashboard design

Action plan

- Prioritize shortage actions by material criticality, backorder value and days until required - not by quantity alone.
- Recalculate safety stock for volatile demand and variable lead times, starting with Machined Parts and Plastics.
- Place the bottom three suppliers on a delivery recovery plan with weekly promise-date and past-due reviews.
- Standardize delay-reason coding and remove documentation failures through a simple pre-shipment checklist.
- Create a daily buyer-planner exception queue for overdue POs, projected stockouts and high-value backorders.

Suggested Power BI pages

Report page	What it answers	Recommended visuals
Operations overview	Where is service at risk today?	KPI cards, fill-rate trend, stockout heat map
Material exceptions	Which materials require action first?	ABC table, backorder value, days-of-supply flags
Supplier delivery	Who is driving late receipts and why?	Supplier OTD ranking, delay Pareto, late-line drill-through

LinkedIn project description

Created a supply chain analytics case study using a fictional manufacturing dataset with 60 materials, 12 suppliers, monthly inventory records and 720 purchase-order lines. I designed a Power BI-ready model and measures for fill rate, stockout events, backorder value and PO on-time delivery. The analysis showed a 98.0% overall fill rate but still uncovered 71 stockout events and \$637K in backorder exposure, demonstrating why exception-level analysis matters. All data is simulated and contains no employer-confidential information.

Skills demonstrated: Inventory planning | Shortage management | PO expediting | Supplier delivery | Power BI | DAX | Supply chain analytics