

USE CASE 07 / COTO PPT 138

Production, materials and maintenance integration

Proposed operating design, version 2.0, 28 October 2026. Source concepts are from the COTO presentation; detailed controls, timelines, test gates and charging units are implementation proposals, not PPT quotations or live-service promises. All examples are synthetic. Prices and trade principal remain USD; local labour payments follow mandatory local rules. No invented partners, committed customers, tariffs or efficiency results are asserted.

Business outcome

Create dependable production visibility across sites and support planner/engineer decisions without handing safety-critical control to an AI model.

Accountable roles

The site planner owns production commitments; the stock custodian owns material counts; the maintenance engineer owns equipment decisions; an integration/data steward owns connector quality and permissions.

Required information

Approved design/order revision; production site and technique; bill of materials and units; opening/received/issued/returned stock; actual output, rework and scrap; work-centre status; approved maintenance intervals; event/source timestamps; labour capacity and safe operating limits.

Separate lifecycle states

Production: planned > materials-checked > work-authorized > in-progress > quality-check > accepted/rework/quarantine > complete. Recommendation: proposed > reviewed > approved/rejected > executed > outcome-checked. A safety stop remains under local authorized control.

THE OPERATING WORKFLOW

From a real input to an approved outcome

01 / Map one real process first

Responsible: Planner + producer/site team

Select one site and technique; document its actual work stages, units and local safety authority. Begin with signed CSV/manual intake rather than an invasive machine connector. Agree collection intervals that match the process and do not imply continuous telemetry from hand weaving.

02 / Reconcile the input data

Responsible: Stock custodian + data steward

Match approved design revision, materials and quantities. Convert units only with documented factors. Check opening plus receipts minus issues plus returns against counted stock; declare yield/waste and quarantine separately. Missing readings are not zeros.

03 / Establish a deterministic baseline

Responsible: Planner + engineer

Use the approved bill of materials, lead times and scheduled maintenance to calculate initial material requirements and checks. Proposed replenishment = $\max(0, \text{planned demand} + \text{agreed safety stock} - \text{usable stock} - \text{reliable due receipts})$. Do not count reserved, quarantined or unconfirmed inbound stock as free supply.

04 / Trial analytical recommendations in shadow mode

Responsible: Data analyst + planner

Only after adequate representative history, compare forecasts/anomaly scores to the baseline without executing them. Record training window, input quality, model version and uncertainty. Exclude invalid sensors and document drift; a handwoven process may not have meaningful predictive-maintenance data.

05 / Approve operational work

Responsible: Authorized planner/engineer

Approve a replenishment or inspection request against budget, supplier capacity and safe procedures. A purchase needs its own agreed order; an engineer controls maintenance and isolation/lockout. The integration must not send autonomous machine commands or override safety interlocks.

06 / Close the work and learn

Responsible: Site team + reviewer

Record material receipt, completed work, actual output/quality and authorized downtime. Reconcile consumption and productivity without exposing individuals unnecessarily or using unsupported performance scores. Investigate errors and authorize any model/rule revision before reuse.

CONTROLS AND IMPLEMENTATION

Make exceptions visible

Failure handling and human safeguards

Material shortfall: propose resequencing or an approved purchase, not unapproved substitution. Faulty sensor or late CSV: mark data stale and revert to local records. Quality hold: quarantine output and maintain the buyer update. Safety alarm: follow site procedures; COTO cannot clear it. Capacity pressure must not be resolved by unlawful hours, pay cuts or hidden child participation.

Blockchain, AI and private evidence

Use read-only connectors initially, per-site credentials, validation and an append-only event log. Future AI is a decision-support component with model/version and uncertainty, not equipment control or worker scoring. Blockchain is optional for selected approved production milestones; most operational measurements should stay in the private production system.

Start with the existing pilot

Link the existing order and lot to a manual production/BOM/material register and record the permitted high-level production_started and dispatch events. Current API does not implement bills of materials, site stock, machine telemetry or maintenance work orders.

Additional software required

Add read-only imports with schema validation, site/unit maps, BOM and batch consumption, work orders, reconciliation and stale-feed indicators. Establish safe connector access and recovery. Add models only after adequate data, a baseline and shadow validation; exact sample size depends on the process and must be justified.

Current boundary: invited profiles, lot/order records and approvals, selected fulfilment events, invoices, operator-attested receipts, balances and protected private audit are configured. Several actions are API-only. Public blockchain worker, payments/crypto/escrow, AI, bidding, public passport resolver, evidence-vault uploads and the richer registers described here are not activated by publishing this design. Roles are proposed functions to assign and resource, not additional named team appointments.

PILOT AND COMMERCIAL VALIDATION

Prove the mechanism before scaling

Synthetic worked scenario

At one synthetic site, plan 20 rugs using an approved BOM. Inject a unit-conversion error, insufficient yarn, a delayed receipt and a maintenance flag. Compare material requirements to a manual calculation; no machine command or procurement payment is sent.

Required acceptance tests

Do not count quarantined yarn as available; reject an unknown unit; retain the last approved design; mark a stale sensor unknown; confirm only the engineer may approve maintenance. Model output must not change an order or safety state.

Measures and go/no-go

Material balance differences; stockout hours; rework; schedule adherence; forecast error versus baseline; false maintenance alerts and actual downtime. Pass only if visibility improves without bypassing safe work or increasing unexplained inventory differences.

Proposed payer, charging unit and cost drivers

Proposed payer: manufacturer/site under a scoped integration and support order. Price initial mapping separately from connector upkeep, hardware and any model service. Validate measurable benefit before adding sensors or paying for large cloud-model workloads.

Pilot sign-off record

Before execution, assign the actual responsible people, permitted data source, cohort/route, approved costs, test dates, evidence reviewer and release authority. Record each test outcome, unresolved exception, manual fallback and rollback procedure. Do not activate an unapproved model, payment provider, public-chain transaction or unsafe equipment connection.

Source and scope

COTO presentation slides 138. Detailed operating steps, test cases and commercial units are new implementation proposals. Read operating-model.pdf for shared controls, templates, release gates and primary technical references. The legal pack remains draft until completed and reviewed.