



# Standard Operating Procedure for Quote-to-Delivery at Smart Laser & MFG

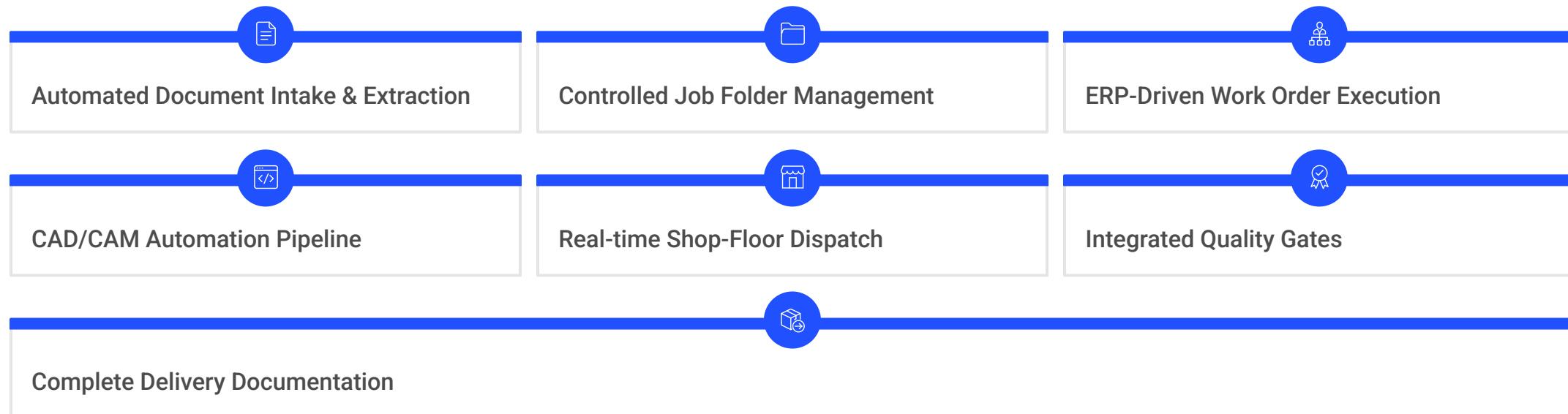
This integrated framework optimizes operations from customer inquiry to final delivery, leveraging digital integration and repeatable processes.

# Executive Summary

This Standard Operating Procedure (SOP) for Smart Laser & MFG outlines a comprehensive, end-to-end process, from quote initiation to final product delivery. Designed for **repeatability, auditability, and scalability**, this SOP empowers new hires—even those without prior fabrication experience—to execute tasks efficiently, eliminating reliance on tribal knowledge.

At its core, the SOP establishes a seamless "digital thread" that integrates document intake, controlled job folder management, ERP work order execution, CAD/CAM program generation, shop-floor dispatch, integrated quality gates, and comprehensive delivery documentation. This process leverages key platforms such as Microsoft 365, Adobe PDF tools, FloorVisio ERP/MRP, and QuickBooks Online, further enhanced by recommended automation and advanced CAD/CAM solutions.

## Digital Thread Architecture



# Key Research-Backed Design Choices

## Document Intake & Extraction

Microsoft Power Automate, powered by AI Builder Document Processing, extracts key fields and line-item data from customer POs and RFQs. It converts unstructured data into a structured format, facilitating seamless downstream workflows and robust audit trails. AI Builder also handles critical transformations like date parsing and numeric conversion.

## Controlled Document Management

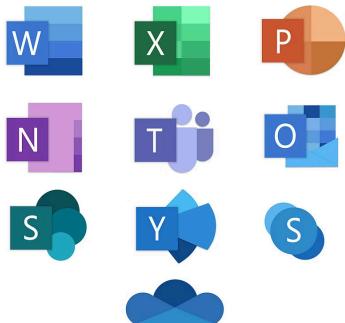
SharePoint document libraries manage all job packets and customer documentation as the system of record. Full version control supports major/minor versions, approvals, and draft visibility, ensuring operational compliance.

## Operational System of Record

FloorVisio functions as the central operational hub, managing quoting, work orders, and task distribution through work center screens. It supports barcoded work orders and streamlines delivery documentation workflows, including scanned packing slips and advance shipping notices.

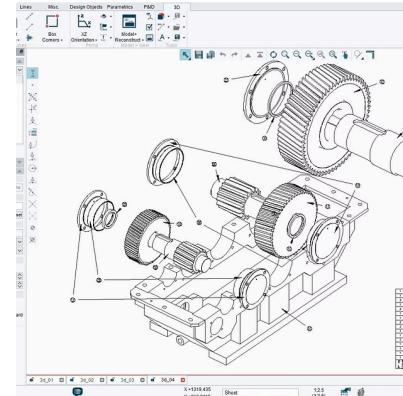
# Technology Stack Foundation

Meet the new icons for Office 365



## Accounting Integration

QuickBooks Online manages invoicing and accounting. Its API seamlessly integrates with FloorVisio to manage invoice workflows and general ledger tasks.



## CAD/CAM Automation

SOLIDWORKS PDM manages release workflows using defined states and check-in/check-out protocols. CAD APIs automatically export flat patterns, populating standardized Manufacturing Output folders for nesting and bending CAM.

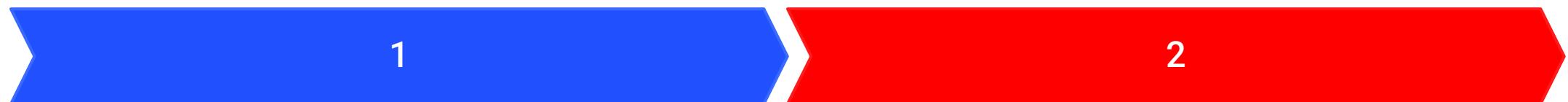


## Nesting & Programming

Nesting CAM platforms like SigmaNEST or Lantek integrate bi-directionally with ERP systems and group work orders. BLM ArTube and Mazak streamline tube cutting. For press brakes, Delem Profile and Cybelec VisiTouch enable offline programming and simulation.

# Scope, Assumptions, and Operational Definitions

This SOP details the entire **Quote-to-Delivery** lifecycle, from initial customer inquiry to final product delivery and operational closeout.



## Start Point

Customers initiate the process by submitting an RFQ or PO for quotation.

## Digital Processing

Automated digital processing manages intake, data extraction, job creation, and program generation.

3

4

## Shop Floor Execution

Execute work center operations, guided by digital travelers and quality gates.

## End Point

Deliver the product with comprehensive documentation, followed by job packet archiving and closeout.

# Core Assumptions

## Communication & Systems

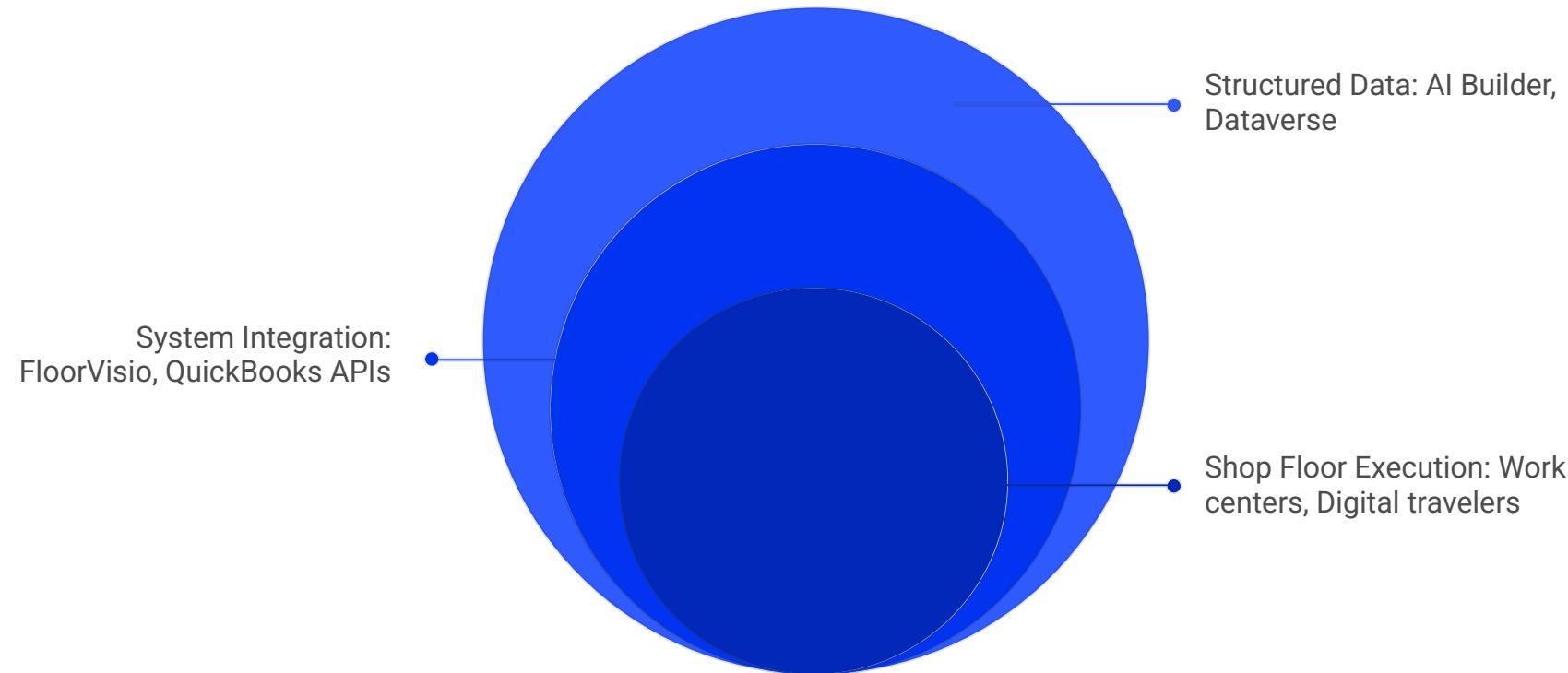
- Outlook manages customer communications via direct emails or shared mailboxes.
- FloorVisio handles quoting, work orders, routing, operations, and shop-floor task distribution.
- QuickBooks Online serves as the official accounting system.
- The CAD/CAM environment supports PDM-controlled lifecycle management and automated exports.

## Operational Definitions

- **RFQ:** Request for Quote – a customer's inquiry for pricing and delivery.
- **PO:** Purchase Order – a formal customer order for items at agreed prices and terms.
- **Work Order (WO):** An internal directive to manufacture specific quantities by a set due date.
- **Router/Routing:** A defined sequence of manufacturing operations (e.g., laser → brake → weld → paint → pack).
- **Job Packet:** A complete set of documents and programs necessary for product manufacturing and shipping.
- **Nesting:** Arranging part shapes on raw material for efficient cutting; CAM generates the machine code.
- **PDM:** Product Data Management – controls versions and revisions through workflow states.

# Reference Architecture and Tooling Blueprint

This SOP uses an integrated tooling architecture that clearly identifies the source of truth for each data domain, preventing duplicate records and uncontrolled edits.



This layered architecture prioritizes rapid ROI while advancing comprehensive system integration. Each layer enhances capabilities without disrupting existing operations.

# Systems of Record and Integration Design

## Customer Documents & Job Packets

- 1 **SharePoint Online** permanently stores and version-controls all customer RFQ/PO documents and internal job packets, using metadata-rich document libraries.

## Operational Work Orders & Routing

- 2 **FloorVisio** is the operational system of record, managing quotes, work orders, routings, shop-floor task distribution, operator instructions, and delivery records.

## CAD Models & Controlled Revisions

- 3 The **PDM System** (SOLIDWORKS PDM) manages CAD models and drawings through workflow states that represent lifecycle stages, and grants exclusive checkout rights for editing.

## Accounting & Invoicing

- 4 **QuickBooks Online** manages all invoicing and accounts receivable. Its API integrates to support automated invoice workflows.

# Integration Strategy: Layered Approach



## Level 1: Rapid Value

Deploy Power Automate cloud flows, integrating SharePoint and Teams, to establish efficient intake, routing, and audit trails. This level delivers immediate value with minimal complexity.



## Level 2: Structured Data Extraction

AI Builder's "Process documents" extracts structured fields and line-item tables from PDFs. This extracted data is then stored in Dataverse or a SharePoint List, forming the "Job Intake Register."



## Level 3: Direct System Integration

Implement scheduled flows or scripts for direct data exchange between systems where FloorVisio supports CSV exports or third-party synchronization. This also covers direct QuickBooks integration.



## Level 4: Legacy UI Automation (RPA)

Employ Power Automate Desktop "desktop flows" (Robotic Process Automation) for UI automation in scenarios lacking direct APIs. This method addresses repetitive desktop processes requiring manual interaction.

# Software Option Comparisons

This section compares software solutions selected to address Smart Laser's critical operational bottlenecks. These bottlenecks, including document extraction, nesting CAM, tube CAM, and press brake offline programming, cause inefficiencies such as manual data entry errors, production delays, and suboptimal material utilization. Our evaluation focused on key criteria: ease of integration, projected ROI, team learning curve, vendor support, and scalability. Our goal is to identify tools that resolve immediate pain points and contribute to long-term operational excellence and competitive advantage.

DOCUMENT PROCESSING   NESTING CAM   TUBE & BRAKE

## Decision-Making Framework for Solution Evaluation

We use a comprehensive framework to select optimal software solutions, assessing immediate benefits and long-term strategic alignment.

01

### System Compatibility & Integration

Prioritize solutions that seamlessly integrate with our existing ERP, CRM, and shop floor machinery. This minimizes data silos and manual transfers.

03

### Total Cost of Ownership (TCO)

Assess TCO beyond initial licensing fees to include implementation, maintenance, support subscriptions, and potential hardware upgrades over a 3-5 year horizon.

05

### Industry-Specific Features

Focus on functionalities tailored for metal fabrication, such as advanced nesting algorithms, precise tube cutting, and intuitive press brake programming.

02

### Staff Training & Adoption

Evaluate the ease of use and learning curve for our workforce, considering potential productivity impacts during transition.

04

### Vendor Stability & Support

Evaluate the provider's market reputation, financial health, support responsiveness, and commitment to ongoing development and innovation.

06

### Data Migration & Implementation Complexity

Analyze the effort required to transfer historical data, configure the new system, and manage the overall rollout to avoid operational disruptions.

## Phased Implementation Approach

To ensure a smooth transition and rapid value realization, we propose a phased implementation strategy, sequencing each solution's adoption based on dependencies and impact.



### Phase 1: Document Processing Automation

Prioritizing solutions for document extraction reduces manual data entry, streamlines order intake, and establishes a foundational 'Job Intake Register'. This phase minimizes disruption and yields immediate efficiency gains.

### Phase 2: Nesting CAM Optimization

Following document processing, we implement nesting CAM. This leverages structured job data for optimal material utilization and reduced waste, directly impacting profitability. This phase can run in parallel with tube CAM for initial setup but relies on accurate job data from Phase 1.

### Phase 3: Tube CAM & Press Brake Programming

We introduce specialized CAM for tube processing and offline press brake programming. These solutions depend on precise geometric data, enriched by earlier phases, ensuring accurate and efficient machine operations.



## OCR and Order-Extraction Options

1

### AI Builder Document Processing

Automates the extraction of fields and tables, integrating seamlessly with Power Automate to support data transformations and workflow orchestration.

- Integration: Power Automate cloud flow action.
- Pricing: Power Platform licensing.
- Complexity: Low-Medium

2

### SharePoint Premium

Identifies, classifies, and extracts metadata directly from documents within SharePoint libraries.

- Integration: SharePoint library model, with optional flow triggers.
- Pricing: Variable consumption/licensing.
- Complexity: Medium

3

### ABBYY FlexiCapture

Offers enterprise-grade document capture and extraction, supporting email inputs and seamless exports to ERP/RPA systems.

- Integration: Vendor APIs/connectors, often via RPA.
- Pricing: Quote-based.
- Complexity: Medium-High

4

### Rossum

Specifically designed for extracting data from unstructured transactional documents, such as purchase orders and packing lists.

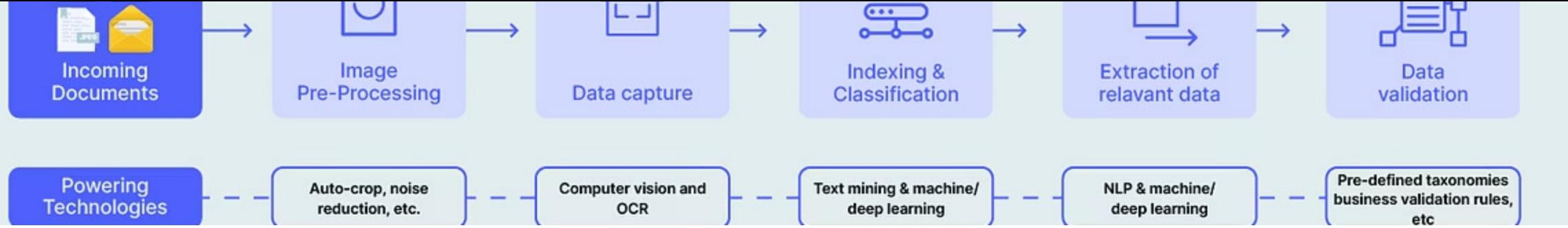
- Integration: API/webhooks via an integration platform.
- Pricing: Demo or enterprise pricing.
- Complexity: Medium

5

### UiPath Document Understanding

Provides a comprehensive framework for document digitization, data extraction, and validation.

- Integration: UiPath workflows and connectors.
- Pricing: Enterprise licensing.
- Complexity: High



## Recommendation: Start with Power Automate + AI Builder

For the core Standard Operating Procedure (SOP), we recommend starting with [Power Automate + AI Builder "Process documents"](#). This solution offers seamless integration with Microsoft 365, native table extraction capabilities, and clear documentation for its flow steps and outputs.

This approach delivers immediate value with minimal integration complexity by leveraging existing infrastructure. Additionally, the platform natively supports essential document transformations, such as date parsing and numeric conversion, which is crucial for efficient processing of purchase orders and RFQs.

### Success Criteria

- Baseline performance target: Extract 90%+ of PO fields correctly on first pass
- Processing time: <30 seconds per document
- Manual review queue: Flag any document with confidence score <70% for human verification

### When to Upgrade

Consider Rossum or ABBYY only if purchase order (PO) formats vary significantly, preventing Microsoft-native extraction from achieving acceptable accuracy at scale. Monitor extraction confidence scores during the initial 90 days to guide this decision.

**Target:**  $\geq 92\%$  field-level extraction accuracy across all critical fields (PO number, line items, quantities, dates, pricing)

**Upgrade threshold:** If accuracy falls below 85% after 90-day evaluation period, or if manual correction time exceeds 5 minutes per document

**Monitor:** AI Builder confidence scores and manual correction rates weekly

# Nesting CAM Options

Option	Key Capabilities	ERP Integration	Best Fit	Complexity Driver	Typical Implementation Effort
SigmaNEST	Provides work-order grouping, "Group By Work Order" nesting controls, and a bi-directional ERP interface.	ERP integration is vendor-defined and relies on existing ERP endpoints.	Suited for shops prioritizing robust nesting optimization and order-driven execution.	Aligning work order data models and program naming.	4-6 weeks (ERP mapping + operator training)
Lantek + Masterlink	Lantek Expert suite focuses on CAD/CAM with dedicated external ERP connectivity. Masterlink facilitates integration.	Masterlink specifically enables ERP ↔ CAD/CAM integration.	Ideal for shops seeking a unified CAM ecosystem and structured ERP data handoffs.	Mapping master data and aligning postprocessors.	6-10 weeks (Masterlink setup + CAM standardization)

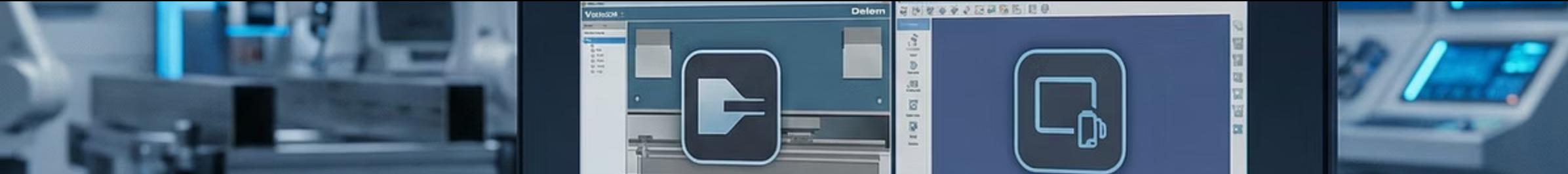
## Selection Guide

### Choose SigmaNEST if:

- Your shop runs >50 work orders/month requiring multi-order nesting optimization
- FloorVisio (or your ERP) exposes REST API or ODBC endpoints for bi-directional sync
- Primary goal: Maximize material utilization through intelligent work-order grouping
- Timeline: 4-6 week implementation for ERP integration + nesting setup

### Choose Lantek + Masterlink if:

- You need unified CAD/CAM/nesting in single ecosystem
- Your ERP requires structured middleware (Masterlink acts as translation layer)
- You plan to standardize on Lantek across multiple machine types (laser, punch, plasma)
- Timeline: 6-10 week implementation including Masterlink configuration



# Tube CAM and Press Brake Offline Programming Options

## 1 Tube Laser Programming

- **BLM ArTube:** This 3D CAD/CAM solution rapidly generates programs for tubular parts from design to final output. It is ideal for BLM tube laser ecosystems or as standard machine software.
- **Mazak Tube DX / FG-CADCAM:** Mazak Tube DX (FG-CADCAM) automates programming to minimize errors and includes comprehensive program verification. This is recommended for Mazak tube lasers, as its native workflows simplify integration.

## 2 Press Brake Offline Programming

- **Delem Profile (S/T):** This software provides offline programming and simulation for bending operations. It covers feasibility analysis, tooling verification, and operator training. Choose this option if your press brakes use Delem controls for optimal compatibility.
- **Cybelec VisiTouch MX Offline:** This solution handles 3D file import, unfolding, automatic tooling selection, bend sequence generation, 3D simulation, and collision checking. Consider it for press brakes equipped with Cybelec controls to enhance compatibility.

## Selection Decision Tree

### Tube Laser Programming:

- If you own BLM tube lasers → Use BLM ArTube (native integration, zero compatibility risk)
- If you own Mazak tube lasers → Use Mazak Tube DX/FG-CADCAM (native workflows, minimal setup)
- If you have mixed/other brands → Evaluate machine control compatibility first; consider third-party CAM with multi-machine postprocessors

### Press Brake Offline Programming:

- If your press brakes use Delem controls → Use Delem Profile S/T (direct controller compatibility)
- If your press brakes uses Cybelec controls → Use Cybelec VisiTouch MX Offline (native control integration)
- If you have mixed controls → Prioritize software that matches your highest-volume press brake; plan manual program transfer for others

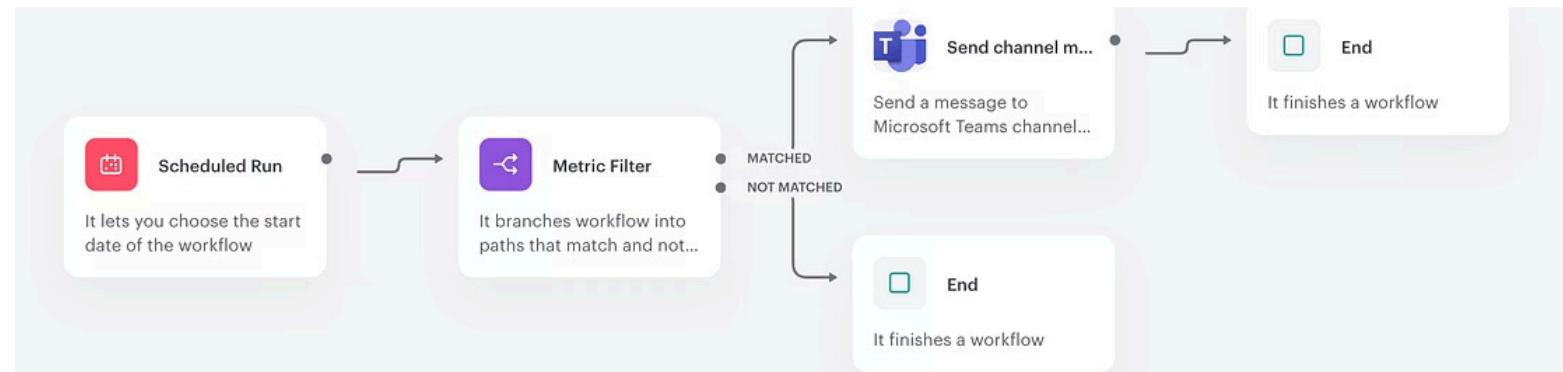
### Key Decision Factor:

Match software to existing machine controls first. Cross-platform solutions add 30-50% more setup complexity and ongoing maintenance overhead.

# Visual Reference Assets

The screenshot shows the Microsoft Power Platform AI Builder interface. On the left, there's a sidebar with options like 'Create', 'Learn', 'My flows', 'Solutions', 'Approvals', 'Connections', 'AI Builder' (which is selected), 'Process advisor', 'More', and 'Power Platform'. The main area has a banner about automating processes. Below it, there's a section titled 'Explore AI models' with categories: 'All', 'Documents', 'Text', 'Structured data', and 'Images'. Under 'Text', there are four cards: 'OpenAI text completion' (Create text, summarize documents, and more with GPT), 'Sentiment analysis' (Detect positive, negative, or neutral sentiment in text data), 'Text processing' (Extract custom information from documents), and 'Text recognition' (Extract all the text in photos (OCR)). Under 'Structured data', there's one card: 'Invoice processing' (Extract information from invoices). At the bottom, there are 'Tutorials' and 'See all' sections.

This screenshot shows the SharePoint Settings page. A red circle labeled '1' highlights the 'Settings' option under 'Policies'. Another red circle labeled '2' highlights the 'Version history limits' option under 'SharePoint'. A third red circle labeled '3' highlights the 'Automatic' option for 'OneDrive accounts or SharePoint document libraries'. A callout box on the right says 'Defaults on Manual (Option)' with a red arrow pointing to the 'Manual' radio button. The 'Set version history limits' section includes options for 'Number of major versions' (set to 500), 'Time' (set to 'Never (Default)'), and a dropdown for 'Options for Time Period' with '1 year' selected.

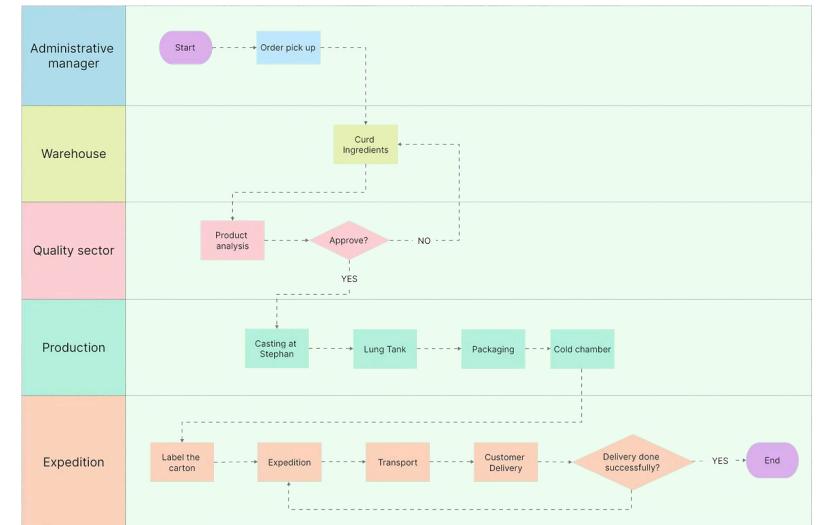


These screenshots display the critical interfaces and features operators utilize during Standard Operating Procedure (SOP) execution. A clear understanding of these visuals is crucial for successful implementation.

# End-to-End SOP

This Standard Operating Procedure (SOP) provides operator-level details for each stage, covering triggers, owners, inputs/outputs, file conventions, actions, acceptance criteria, and error handling. This comprehensive framework ensures that personnel can execute tasks effectively, even without prior fabrication experience.

"The goal is not just documentation – it's creating a system so clear that tribal knowledge becomes unnecessary."



# Governance Rules for Every SOP Step

## Rule A: One Job = One Folder

Upon accepting an RFQ for quotation, create a dedicated job folder. This folder serves as the central repository for all project documents, including purchase orders, quotes, drawings, programs, inspection records, and shipping documents.

## Rule B: No Uncontrolled Documents

Save all customer-related documents to SharePoint, not email. Email functions solely as a transport layer; SharePoint is the official, version-controlled system of record.

## Rule C: Auditable Register

Automated processes create auditable entries. Log every intake and status change in a structured "Job Intake Register" (e.g., Dataverse or SharePoint List).

## Rule D: Single Digital Traveler

The shop floor uses a single "digital traveler." Access work instructions and the latest released drawings/programs directly from FloorVisio work center screens and SharePoint links.

# Standard File Structure and Naming Conventions

## SharePoint Site Structure

<https://{{TENANT}}.sharepoint.com/sites/Ops>

### Document Library: Jobs

#### Folder Structure:

Jobs / {YYYY} / {CustomerName} / {JobID}\_{CustomerPO# or RFQ#} /

#### Standard Subfolders

- 00\_Customer\_Docs/ – Stores customer purchase orders, specifications, and correspondence.
- 01\_Quote/ – Contains quotation PDFs and cost breakdowns.
- 02\_Engineering/ – Holds released drawings (DXF, STEP, PDF formats).
- 03\_CAM\_Programs/ – Houses laser, tube, and brake machine programs.
- 04\_QA/ – Quality Assurance records: inspection reports, non-conformance reports (NCRs), and material certifications.
- 05\_Shipping/ – Shipping documentation: packing lists, bills of lading (BOL), labels, and proof of delivery (POD).
- 99\_Closeout/ – Final signed documents and retrospective notes.

## Naming Convention (Core)

{JobID}\_{CustomerAbbrev}\_{Part#}\_{Rev}\_{DocType}{YYYYMMDD}.{ext}

## Examples

J-2026-00318\_MORT\_BAY-42PNL-3R-31861-35\_A\_PO\_20260204.pdf

J-2026-00318\_MORT\_BAY-42PNL-3R-31861-35\_A\_FLATPATTERN\_20260210.dxf

J-2026-00318\_MORT\_NEST01\_10GA\_A36\_20260212.nc

## FloorVisio Job Identifier Standard

JobID format: J-{YYYY}-{NNNNN}

*(This format serves as a placeholder and will align with the FloorVisio internal ID during implementation.)*

# RFQ Intake and Job Registration

## STEP 1

**Purpose:** This process prevents lost RFQs, establishes a unified audit trail, and enables immediate automation of subsequent steps.

### Trigger

An RFQ email arrives in the designated RFQ mailbox (whether directly or forwarded by Sales). Power Automate continuously monitors this mailbox, supporting shared mailboxes via the Office 365 Outlook connector.

### Owner

Inside Sales / Customer Service Representative (CSR)

### Inputs

- Email with attachments (PO/RFQ PDF, drawings/specifications, revision notes)
- Customer name and contact information

### Tools

Outlook, Power Automate, SharePoint, Teams, Adobe Acrobat (optional OCR)

### Outputs

- A SharePoint job folder is created.
- A new entry is recorded in the Job Intake Register (Dataverse/SharePoint List).
- A Teams notification is posted.

### Acceptance Criteria

- The RFQ is successfully recorded in the Job Intake Register, including a link to the SharePoint folder.
- All attachments are present and readable within SharePoint.
- The Teams notification includes a link to the job folder and extracted headline data.

# RFQ Intake: Exact Actions (How)

01

## Outlook (Manual)

Forward RFQ emails received in personal inboxes to  
`{RFQ_SHARED_MAILBOX@smartlaser.com}`.  
Use the subject line format: RFQ - {Customer} -  
`{Project/PO#}` - {DueDate}.

02

## Power Automate Cloud Flow: "RFQ Intake v1" (Automated)

This flow triggers when a new email (V3) arrives in the shared RFQ mailbox. It performs the following actions: (a) Creates a standardized SharePoint folder structure; (b) Saves email attachments to  
`00_Customer_Docs/`; (c) Saves the email body as `.EML` or `.HTML`; (d) Posts a notification to the `#rfq-intake` Teams channel.

03

## AI Extraction (Automated or Semi-Automated)

When an attachment is a PO PDF, AI Builder's "Process documents" function extracts key data. This data—including customer, PO number, PO date, ship-to, bill-to, due date, total, and line items (part number, quantity, unit price)—is recorded in the Job Intake Register. The extracted data is then available for downstream processes.

- ❑ **Error Handling:** If attachments are missing, the flow posts a "Missing documents" alert to Teams and assigns a "Request missing documents" task to the CSR. If extraction confidence falls below 0.85, the item routes to a "Human validation" queue.

# RFQ Qualification and Scope Confirmation

## STEP 2

**Purpose:** Define the RFQ's scope and confirm quoting adheres to correct revisions and requirements.

**Trigger:** A new row created in the Job Intake Register.

**Owner:** Estimator (Primary), Sales (Support)

### 1 Open and Review Documents

Open the PO/RFQ PDF from the SharePoint job folder. If the PDF is scanned or unsearchable, use Adobe Acrobat's OCR function (All tools > Scan & OCR > Recognize Text (In This File)). This converts image-only text to selectable, searchable content.

### 2 Complete RFQ Qualification Checklist

Using the Excel template from 01\_Quote/Templates/, confirm all required details: drawings/models, revision number, material callouts, finish/plating requirements, and quality/packaging specifications. Save the completed checklist as {JobID}\_RFQ\_QUAL.xlsx.

### 3 Request Clarifications if Needed

If essential information is missing, send an "RFQ Clarification Request" using the Outlook email template. Store a copy of the sent email in 00\_Customer\_Docs/. Record the "Quoteable: Yes/No" decision in the Job Intake Register.

# Costing and Quote Generation

STEP 3

**Purpose:** Generate defensible quotes based on traceable assumptions and repeatable costing logic.

**Trigger:** RFQ is "Quoteable: Yes."

**Owner:** Estimator (primary), Engineering (manufacturability support), Purchasing (material pricing validation)

## FloorVisio Quote Entry

1. Navigate to Quotes > New Quote.
2. Select or create the customer record.
3. Create quote line items from the extracted PO line table, either by pasting/importing or manual entry.

## Excel Costing Workbook

Use the QuoteCostModel\_v1.xlsx template from 01\_Quote/Templates/. For each part number:

- Define the process route (e.g., "flat laser only," "flat + brake," "tube laser," "weldment").
- Estimate cycle times for each operation.
- Apply material costs and scrap factors.

Save the workbook as 01\_Quote/{JobID}\_QuoteCostModel\_v1.xlsx.

Document all assumptions in a standardized "Assumptions" section, covering revision, material grade, finish, tolerances, packaging, and shipping terms. Generate the customer quote PDF as 01\_Quote/{JobID}\_QUOTE\_{Customer}\_{YYYYMMDD}.pdf.

# Quote Approval and Order Entry

STEP 4

**Purpose:** Convert quotes into controlled sales orders, ensuring accurate pricing, terms, and deliverables.

**Trigger:** Customer issues Purchase Order (PO) or written acceptance.

**Owner:** CSR / Sales Ops



Perform AI Builder extraction (if not yet completed) to capture essential PO data, including number, date, due date, terms, totals, ship-to/bill-to details, and line items. The AI Builder processes PDFs and outputs this data to table cells. Within FloorVisio, create the Sales Order, linking both the PO and the original quote. Finally, send an Order Acknowledgement email to the customer, confirming quantities, due dates, pricing, and all agreed-upon assumptions.

- Error Handling:** If the PO price deviates from the quoted price, immediately halt processing. Escalate the discrepancy to Sales and the Estimator for resolution before accepting the order.

# Customer-Required Acknowledgement and Compliance Checks

## STEP 5

**Purpose:** Ensure immediate compliance with contractual customer requirements to prevent chargebacks and foster strong customer relationships.

**Trigger:** Purchase Order (PO) accepted.

**Owner:** CSR

- Review the PO for special instructions.
- Document customer requirements in the [Customer Requirements Register](#) (SharePoint list) and link them to the PO.
- Post a summary to the Teams #job-launch channel.

**Acceptance Criteria:** All mandatory requirements must be explicitly defined as job requirements and routed to production/QC.

**Error Handling:** If a requirement is unclear (e.g., overship percentage tolerance), seek written clarification before shipping.

# Engineering Release and Manufacturing Output Generation

## STEP 6

**Purpose:** Standardize production release criteria and automate manufacturing output generation to eliminate engineering bottlenecks.

**Trigger:** Sales order created and scheduled for production.

**Owner:** Engineering Lead / Programmer

## PDM Lifecycle Discipline

Ensure files are in the designated PDM workflow state (e.g., Initiated, Waiting for Approval, Approved).

**To Edit:** Check out files to gain exclusive editing rights.

**After Changes:** Check in files. Close all other applications before checking in, as PDM operations may fail.

## Automated Export of Manufacturing Outputs

For sheet metal parts, run the `ExportToDWG2` SOLIDWORKS API macro. This macro exports sheet metal elements to DXF/DWG, preserving filename conventions.

Export outputs to `02_Engineering/Released/{Part#}_{Rev}/`:

- Flat pattern: `.DXF`
- Drawing: `.PDF`
- Model exchange (if required): `.STEP`

**Acceptance Criteria:** Parts cannot enter CAM nesting without "Released" artifacts. All outputs must match an approved revision state in PDM or the customer's approved revision in the job folder.

# CAM Programming and Nesting

## STEP 7

**Purpose:** Generate consistent, machine-ready programs, linking them to work orders for clear traceability.

**Trigger:** Engineering outputs are released.

**Owner:** CAM Programmer

**Inputs:** DXFs/geometry, quantities, material specifications, due date

### → Categorize Parts

Categorize parts by material, thickness, process (laser vs. tube), and priority due date.

### → SigmaNEST

Use SigmaNEST's work-order grouping features to nest parts. Leverage its dedicated "Group By Work Order" functionality and ERP interfacing options.

### → Lantek

If implemented, utilize Masterlink for integrated ERP/MRP to CAD/CAM functionality, which connects seamlessly with Lantek CAD/CAM systems.

### → Save Outputs to SharePoint

Laser nests: 03\_CAM\_Programs/Laser/{Material}/{Thickness}/  
Tube programs: 03\_CAM\_Programs/Tube/  
Nest report PDFs: 03\_CAM\_Programs/Reports/

# Step 8: Press Brake Offline Programming and Setup Sheets

STEP 8

**Purpose:** Provide precise bend sequences, tooling, gauges, and collision checks to minimize setup errors and rework.

**Trigger:** Initiated when cut parts require bending.

**Owner:** Brake Programmer / Brake Lead

## Software Options

- **Delem Profile:** Provides offline programming, simulation, manufacturability assessment, tooling verification, and integrated note management.
- **Cybelec VisiTouch MX Offline:** Imports and unfolds 3D files, automates tooling and bend sequence generation, and performs dynamic 3D simulation for collision detection.

**Acceptance Criteria:** Setup sheets must detail tooling, bend order, backgauge positions, and collision check status. Programs must be versioned and linked to their respective revisions in SharePoint/PDM.

**Error Handling:** If offline import fails, verify the file format. If a collision is detected, flag the issue for 'Engineering revision' or 'Alternate tooling' as required.

## Process Steps

1. Import part files into offline programming software.
2. Generate the bend sequence and select appropriate tooling.
3. Export controller-specific brake program files and setup sheet PDFs.
4. Store files in: 03\_CAM\_Programs/Brake/{PressBrakeID}/

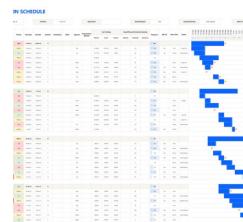
# Production Scheduling and Dispatch

STEP 9

**Purpose:** Optimize material, labor, and machine capacity to meet production deadlines and ensure compliance with established controls.

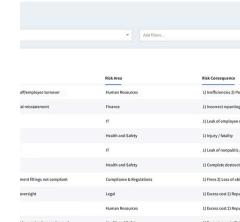
**Trigger:** Initiated when programs and material plans are finalized.

**Owner:** Production Planner



## Work Center Configuration

Ensure each FloorVisio operation has an assigned Work Center (Flat Laser / Tube Laser / Brake / Weld / QA / Pack) and a standard or target time.



## Daily Dispatch Queue

Distribute the daily dispatch queue to FloorVisio work center screens, displaying task assignments across workstations and work centers. Post daily priorities in the #production-daily Teams channel.

**Acceptance Criteria:** Every production job has a visible next-step assignment and due date. Operators begin work only with the latest program and traveler link.

**Error Handling:** In case of capacity conflicts, escalate to Operations, update the ship commitment date, and notify Sales.

STEP 10

## Step: Shop-Floor Execution by Work Center

**Purpose:**

Standardize work execution, completion recording, and exception management for all work center operators.

This standard operating procedure (SOP) establishes a consistent execution pattern for all work centers (flat laser, tube laser, brake, weld/assembly, finishing), enabling new team members to quickly and effectively follow established processes.

**Owner:**

Work center operator and Lead Hand

**Tools:**

FloorVisio work center screen, SharePoint job packet, machine controller, barcode scanner (if deployed)

- 1 Access the next assigned task on the FloorVisio work center screen.
- 2 Verify Job ID, Part Number (including revision), and Quantity against task details.
- 3 Open the digital traveler link from SharePoint for job instructions.
- 4 Perform first-piece verification before starting full quantity production.
- 5 Record job completion in FloorVisio (clock in/out, complete quantity, scrap quantity).



# Step: Packaging, Shipment, and Proof of Delivery Capture

STEP 11

**Purpose:** Ensure accurate delivery, prevent customer claims, and maintain complete documentary evidence.

**Trigger:** Final QA releases the job for shipment.

**Owner:** Shipping Coordinator

## Key Shipping Actions

1. Prepare packing list and labels.
2. Create the shipment record in FloorVisio and distribute tracking information.
3. Scan the signed packing slip/POD and attach it to the job record.
4. Save all shipping documentation to 05\_Shipping/.

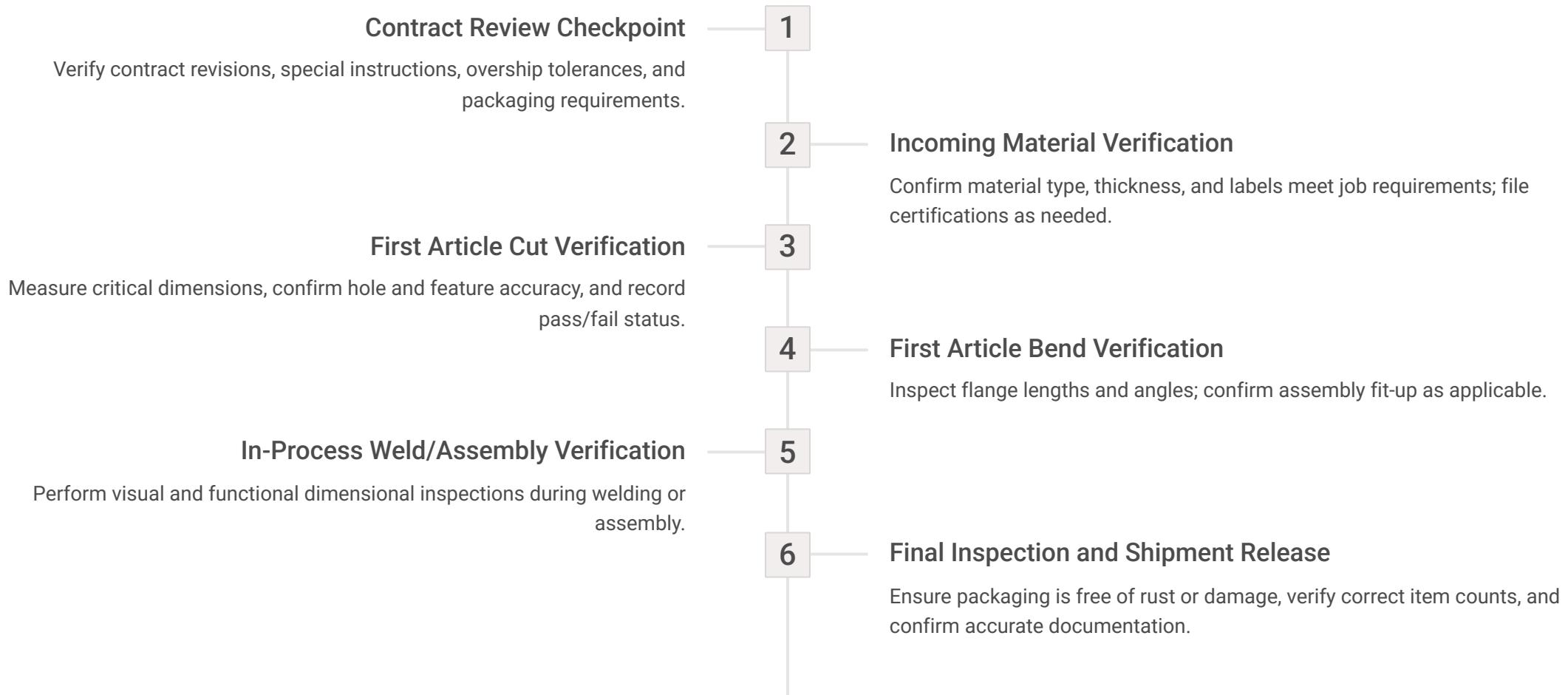
FloorVisio automatically notifies customers with tracking information and includes a core feature for scanning and filing signed packing slips with each delivery.

### Acceptance Criteria:

- Ship correct quantities.
- Store and link all shipping documentation to the job folder.
- Comply with customer-specific shipping constraints.

**Error Handling:** If a partial shipment is required, create a partial shipment record and ensure the remaining balance remains open.

# Quality Gates, KPIs, and Contingency Procedures



To ensure robust documentation and version control, configure SharePoint versioning at the library level.