



Assembly Production System - SOP

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1. System Overview

1.1 Purpose

This system manages assembly production workflow using three synchronized display stations that guide workers through each production stage with real-time BOMs, process instructions, and instructional videos.

1.2 System Components

- **Display Station 1:** BOMs & Reference Materials
- **Display Station 2:** Process Instructions (with navigation controls)
- **Display Station 3:** Instructional Videos
- **Admin Dashboard:** Product and workflow management

- **Supervisor Dashboard:** Real-time monitoring and control

1.3 Core Workflow Structure

Each product follows a structured workflow:

1. **Assembly Stages** (e.g., Sub Assembly 1, Sub Assembly 2, Final Assembly)
 2. **Assembly Processes** within each stage
 3. **BOM Templates** for material requirements
 4. **Media Files** for instructions and documentation
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2. Pre-Production Setup

2.1 Product Configuration

2.1.1 Create New Product

1. Access Admin Dashboard
2. Navigate to "Products" section
3. Click "Create New Product"
4. Enter:
 - **Product Code:** Unique identifier (uppercase)
 - **Product Name:** Descriptive name
5. Save product configuration

2.1.2 Define Assembly Stages

1. In Admin Dashboard, select the product
2. Go to "Assembly Stages" tab
3. Create stages in sequence order:
 - **Stage Name:** Internal reference
 - **Display Name:** User-friendly name
 - **Order:** Sequence number

2.1.3 Configure Assembly Processes

1. For each stage, define processes:
 - **Process Name:** Internal reference
 - **Display Name:** User-friendly name
 - **Location:** Assembly Room or Outside Assembly Room
 - **Order:** Sequence within stage

2.2 BOM Template Setup

2.2.1 Create BOM Items Master List

1. Navigate to "BOM Items" in Admin Dashboard
2. For each item, enter:
 - **Item Code:** Unique identifier
 - **Item Description:** Detailed description
 - **Part Number:** Manufacturing part number
 - **Unit of Measure:** NO., KGS, GM, LTR, etc.
 - **Item Photo:** Clear reference image
 - **Supplier:** Source information
 - **Cost per Unit:** Pricing data
 - **Weight per Unit:** Logistics data

2.2.2 Create BOM Templates

1. Go to "BOM Templates" section
2. Create templates for each requirement:
 - **Single Unit:** Individual item production
 - **Batch 50:** Standard batch production
 - **Stage-specific BOMs:** For each assembly stage
3. Configure template settings:
 - **Template Name:** Descriptive identifier
 - **BOM Type:** Single Unit, Batch 50, or Stage-specific
 - **Duration:** Display time (seconds)
 - **Display Assignment:** Which screens show this BOM
 - **Duration Active:** Auto-advance setting

2.2.3 Populate BOM Template Items

1. For each template, add required items:
 - **Serial Number:** S.NO in BOM
 - **BOM Item:** Select from master list
 - **Base Quantity:** Quantity for single unit
 - **Notes:** Special instructions
 2. Use bulk upload for large BOMs via Excel import
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3. Production Workflow Management

3.1 Production Start-up

3.1.1 Supervisor Dashboard Setup

1. Access Supervisor Dashboard
2. In "Quick Setup" section:
 - **Select Product:** Choose from dropdown
 - **Set Quantity:** Enter production quantity
 - **Click "Apply to All Displays"**
3. System automatically configures all displays with:

- First stage selection
- First process selection
- Appropriate BOM display

3.1.2 Verify Display Configuration

1. Check "Display Status Overview":
 - **Display 1:** Shows BOM data availability
 - **Display 2:** Shows process instructions
 - **Display 3:** Shows instructional videos
2. Confirm all displays show "Connected" status

3.2 Production Navigation

3.2.1 Process Advancement

Manual Navigation:

- Use navigation buttons in Supervisor Dashboard
- **Previous Process:** Move backward in workflow
- **Next Process:** Move forward in workflow
- **Toggle Loop Mode:** Enable/disable process loops

Automatic Loop Mode:

- Continues cycling until manually advanced
- Duration: 30 seconds per process (configurable)

3.2.2 BOM Pagination Control

For Multi-page BOMs:

- Use arrow keys (↑/↓) for page navigation
- System supports split display across 3 screens
- Global controls affect all displays simultaneously

4. Display Station Operations

4.1 Display Station 1 (BOMs & Reference)

4.1.1 Primary Functions

- Display current BOM for selected quantity
- Show material requirements per process
- Provide visual reference for components

4.1.2 BOM Display Modes

- **Single Unit BOM:** Individual item requirements
- **Batch BOM:** Scaled quantities for production run
- **Stage-specific BOM:** Materials needed for current stage

4.1.3 Pagination Handling

- Automatically splits large BOMs across displays
- Shows page numbers and total pages
- Synchronizes with other displays

4.2 Display Station 2 (Process Instructions)

4.2.1 Primary Functions

- Display current process instructions
- Provide navigation controls (if enabled)
- Show process documentation and guides

4.2.2 Navigation Controls

- **Left Arrow (←):** Previous process
- **Right Arrow (→):** Next process
- **Space Bar:** Toggle loop mode
- **Manual Override:** Stops automatic progression

4.2.3 Status Indicators

- Loop mode indicator when active
- Process progression display
- Connection status monitoring

4.3 Display Station 3 (Instructional Videos)

4.3.1 Primary Functions

- Play instructional videos for current process
- Display training materials
- Show visual demonstrations

4.3.2 Video Management

- Automatic playback based on process
- Configurable duration per video
- Error handling for video issues

5. BOM Management

5.1 Real-time BOM Updates

5.1.1 Automatic Refresh

- BOM content refreshes every 25 seconds
- Maintains current pagination state
- Updates quantity calculations automatically

5.1.2 Quantity Scaling

- Single unit quantities multiply by production quantity
- Stage-specific BOMs remain at base quantity
- Unit conversions handled automatically

5.2 BOM Pagination

5.2.1 Split Display Logic

- **Items per display:** 8 items maximum
- **Total items per page:** 24 (8 × 3 displays)
- **Auto-pagination:** For duration-active BOMs
- **Manual pagination:** Arrow key navigation

5.2.2 Page Navigation Rules

- Next page when current page full
- Return to page 1 after last page
- Maintain page state during process changes

5.3 BOM Content Management

5.3.1 Item Display Format

- Serial number and item code
- Item description and part number
- Calculated quantity with units
- Item photo reference
- Special notes if applicable

5.3.2 Visual Indicators

- Color coding for different unit types
- Highlighting for critical items
- Status indicators for availability

6. Media Content Management

6.1 Media File Types

6.1.1 Supported Formats

- **Videos:** MP4, MOV, AVI, MKV, WebM
- **Documents:** PDF process instructions
- **Images:** JPG, PNG for references
- **BOMs:** Database-generated content

6.1.2 Upload Methods

- **Single File Upload:** Individual media files
- **ZIP Bulk Upload:** Multiple files simultaneously
- **Excel Import:** BOM data with images

6.2 Media Assignment

6.2.1 Process Association

- Link media to specific assembly processes
- Configure display screen assignments
- Set playback duration and auto-advance

6.2.2 Display Distribution

- **Display 1:** BOM-focused content
- **Display 2:** Process instruction documents
- **Display 3:** Video demonstrations

6.3 Content Validation

6.3.1 File Verification

- Check file format compatibility
- Verify file integrity
- Test media playback

6.3.2 Assignment Validation

- Confirm process associations
- Verify display assignments
- Test duration settings

7. Quality Control Procedures

7.1 Pre-Production Checks

7.1.1 System Readiness Verification

- ☐ All displays show "Connected" status
- ☐ Product configuration complete
- ☐ BOM templates populated
- ☐ Media files assigned
- ☐ Navigation controls functional

7.1.2 Content Validation

- ☐ BOM quantities accurate for production run
- ☐ Process sequence verified
- ☐ Media content matches current processes
- ☐ Display assignments correct

7.2 Production Monitoring

7.2.1 Real-time Checks

- Monitor display synchronization
- Verify BOM pagination accuracy
- Check process advancement timing
- Validate loop mode operations

7.2.2 Error Response

- Document any system errors
- Implement immediate corrections
- Report issues to technical support
- Maintain production continuity

7.3 Post-Production Review

7.3.1 Session Documentation

- Record production quantities
- Note any system issues
- Document process deviations
- Update procedures if needed

7.3.2 System Maintenance

- Clear temporary data
 - Update BOM templates if needed
 - Archive session records
 - Prepare for next production run
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8. Troubleshooting Guide

8.1 Display Issues

8.1.1 Connection Problems

Symptoms: Display shows "Offline" or "Connection Lost" **Solutions:**

1. Check network connectivity
2. Refresh browser page
3. Restart display system
4. Contact technical support

8.1.2 Content Loading Issues

Symptoms: Media not loading, blank screens **Solutions:**

1. Check media file accessibility
2. Verify display assignments
3. Test alternative media files
4. Clear browser cache

8.2 BOM Problems

8.2.1 Pagination Issues

Symptoms: Incorrect page numbers, missing items **Solutions:**

1. Refresh BOM data manually
2. Verify template configuration
3. Check quantity calculations
4. Reset pagination to page 1

8.2.2 Quantity Calculation Errors

Symptoms: Wrong quantities displayed **Solutions:**

1. Verify production quantity input
2. Check BOM template base quantities
3. Confirm unit of measure settings
4. Recalculate using fresh data

8.3 Navigation Problems

8.3.1 Stuck in Loop Mode

Symptoms: Cannot advance past loop processes **Solutions:**

1. Use manual navigation override

2. Toggle loop mode off
3. Reset station configuration

8.3.2 Process Synchronization Issues

Symptoms: Displays showing different processes **Solutions:**

1. Use "Apply to All Displays" in Supervisor Dashboard
 2. Manually synchronize each display
 3. Reset all stations
 4. Restart system if necessary
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9. Admin Dashboard Operations

9.1 Four-Step Workflow Management

The Admin Dashboard provides a comprehensive 4-step workflow management system accessed through the main interface:

9.1.1 Step 1: Assembly Stages Configuration

Purpose: Define the main stages of the production workflow

Access: Admin Dashboard → Select Product → Step 1: Assembly Stages

Operations Available:

- **Create Stage:** Click "Add Stage" button
- **Edit Stage:** Click edit icon on existing stage card
- **Delete Stage:** Click delete icon (removes all associated processes)
- **View Stage Details:** Each card shows processes count and order

Required Fields:

- Stage Name (internal reference)
- Display Name (user-friendly name)
- Order (sequence number)

Visual Indicators:

- Order number badge (white circle with blue number)
- Process count indicator
- Red header with stage information

9.1.2 Step 2: Assembly Processes Configuration

Purpose: Define individual processes within each stage

Access: Admin Dashboard → Select Product → Step 2: Assembly Processes

Operations Available:

- **Create Process:** Click "Add Process" button
- **Edit Process:** Click edit icon on process card
- **Delete Process:** Click delete icon
- **Assign to Stage:** Select from dropdown during creation

Required Fields:

- Assembly Stage (dropdown selection)
- Process Name and Display Name
- Order within stage
- Location (Assembly Room or Outside)

Visual Organization:

- Processes grouped by stage
- Color-coded order numbers
- Loop indicators for repetitive processes
- Location markers

9.1.3 Step 3: BOM Templates Configuration

Purpose: Create and manage Bill of Materials templates

Access: Admin Dashboard → Select Product → Step 3: BOM Templates

Operations Available:

- **Create Template:** Click "Add Template" button
- **Edit Template:** Click edit icon on template card
- **Delete Template:** Click delete icon (removes all items)
- **Manage Items:** Click list icon to add/edit BOM items
- **Bulk Upload:** Click "Bulk Upload" for Excel import
- **Display Assignment:** Configure which screens show template

Template Configuration:

- Template Name and Type selection
- Stage association (optional)
- Duration settings for auto-advance
- Display screen assignments (1, 2, 3)
- Duration active toggle

BOM Items Management:

- **Add Items:** Select from master BOM items list
- **Set Quantities:** Base quantity per unit

- **Serial Numbering:** S.NO for BOM display
- **Notes:** Special instructions
- **Photo Association:** Linked from master items

Bulk Upload Process:

- Excel format: S.NO, Code, Item Description, Part No., QTY, UOM, Item Photo
- Template selection required
- Default unit of measure setting
- Overwrite existing option

9.1.4 Step 4: Product Media Management

Purpose: Upload and organize instructional media files

Access: Admin Dashboard → Select Product → Step 4: Product Media

Operations Available:

- **Add Media:** Click "Add Media" button for single files
- **ZIP Upload:** Click "ZIP Upload" for bulk media upload
- **Edit Media:** Click edit icon on media card
- **Delete Media:** Click delete icon
- **Preview Files:** View file content before upload
- **Display Assignment:** Configure screen assignments

Supported File Types:

- **Videos:** MP4, MOV, AVI, MKV, WebM
- **Documents:** PDF process instructions
- **Images:** JPG, PNG for references

Media Configuration:

- Media type classification
- Duration settings (seconds)
- Process association (optional)
- Display screen assignments (1, 2, 3)
- File preview and validation

ZIP Bulk Upload:

- Automatic file type detection
- Default duration setting
- Process assignment for all files
- Display screen assignment for all files

9.2 Admin Panel Backend Operations

9.2.1 Product Management

Access: Django Admin Panel → Products

Operations:

- Create new products with codes and names
- View media and BOM counts
- Manage product relationships
- Track assembly session history

9.2.2 BOM Items Master Management

Access: Django Admin Panel → BOM Items

Operations:

- **Excel Upload:** Bulk upload BOM items with photos
- **Item Creation:** Individual item entry with full details
- **Photo Management:** Upload and associate item images
- **Cost Tracking:** Maintain pricing information
- **Supplier Management:** Track source information

Excel Upload Process:

1. Access "Upload BOM Items from Excel" button
2. Select Excel file with required columns
3. Set default unit of measure and supplier
4. Choose overwrite existing items option
5. Process uploads automatically extracts embedded images
6. Review success/error reports

9.2.3 BOM Template Management

Access: Django Admin Panel → BOM Templates

Operations:

- Create templates for different production types
- Associate with assembly stages
- Configure pagination settings (split across displays)
- Set duration and auto-advance options
- Preview BOMs at different quantities

9.2.4 Station Configuration

Access: Django Admin Panel → Stations

Operations:

- Configure display assignments (1, 2, 3)
- Set current assembly state

- Configure BOM display preferences
- Enable/disable clicker controls
- Monitor real-time status

9.3 CRUD Operations Reference

9.3.1 Create Operations

Products:

- Admin Dashboard: "Create New Product" button
- Admin Panel: Add Product form

Assembly Stages:

- Admin Dashboard: "Add Stage" button in Step 1
- Admin Panel: Add Assembly Stage form

Assembly Processes:

- Admin Dashboard: "Add Process" button in Step 2
- Admin Panel: Add Assembly Process form

BOM Templates:

- Admin Dashboard: "Add Template" button in Step 3
- Admin Panel: Add BOM Template form

BOM Items:

- Admin Dashboard: BOM Items Management modal
- Admin Panel: Individual item creation or Excel bulk upload

Media Files:

- Admin Dashboard: "Add Media" or "ZIP Upload" in Step 4
- Admin Panel: Add Product Media form

9.3.2 Read/View Operations

Dashboard Views:

- Product workflow overview with statistics
- Stage and process hierarchical display
- BOM template cards with item counts
- Media files organized by type

Admin Panel Views:

- Detailed list views with filters and search
- Individual record detail views

- Related object displays (inline editing)

9.3.3 Update Operations

Edit Capabilities:

- All entities support edit through dashboard modals
- Admin panel provides detailed edit forms
- Bulk update operations where applicable
- Real-time validation and feedback

9.3.4 Delete Operations

Safety Features:

- Confirmation dialogs for all delete operations
- Cascade delete warnings (stages → processes)
- Soft delete options where appropriate
- Backup and recovery procedures

9.4 Data Validation and Error Handling

9.4.1 Form Validation

- Required field validation
- Format checking (product codes, numbers)
- File type validation for uploads
- Relationship integrity checks

9.4.2 Upload Error Handling

- File format validation
- Size limit enforcement
- Corrupt file detection
- Partial success reporting

9.4.3 Batch Operation Results

- Success/failure counts
- Error detail reporting
- Rollback options for failed operations
- Data integrity maintenance

10. Roles and Responsibilities

9.1 Production Supervisor

9.1.1 Daily Responsibilities

- Configure production runs using Supervisor Dashboard
- Monitor display status and functionality
- Navigate production workflow as needed
- Resolve immediate operational issues

9.1.2 Quality Assurance

- Verify BOM accuracy before production
- Monitor process compliance
- Document any deviations
- Coordinate with technical support

9.2 System Administrator

9.2.1 System Configuration

- Manage product definitions
- Configure assembly stages and processes
- Maintain BOM templates and items
- Upload and organize media content

9.2.2 System Maintenance

- Monitor system performance
- Update configurations as needed
- Manage user access and permissions
- Coordinate system updates

9.3 Production Workers

9.3.1 Display Usage

- Follow instructions on assigned displays
- Use navigation controls when authorized
- Report display issues immediately
- Maintain focus on current process

9.3.2 Quality Compliance

- Follow BOM requirements exactly
- Complete processes as instructed
- Report material discrepancies
- Maintain production documentation

9.4 Technical Support

9.4.1 System Support

- Resolve technical issues
- Maintain system infrastructure
- Implement system updates
- Provide user training

9.4.2 Documentation

- Update system procedures
 - Maintain troubleshooting guides
 - Document system changes
 - Provide user manuals
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Emergency Procedures

System Failure Response

1. Immediate Actions:

- Document current production status
- Switch to manual production procedures
- Contact technical support
- Preserve data integrity

2. Recovery Steps:

- Assess system damage
- Implement repair procedures
- Test system functionality
- Resume production operations

Data Recovery

1. Backup Verification:

- Check data backup integrity
 - Verify recovery procedures
 - Test restoration process
 - Update backup systems
-