HCL
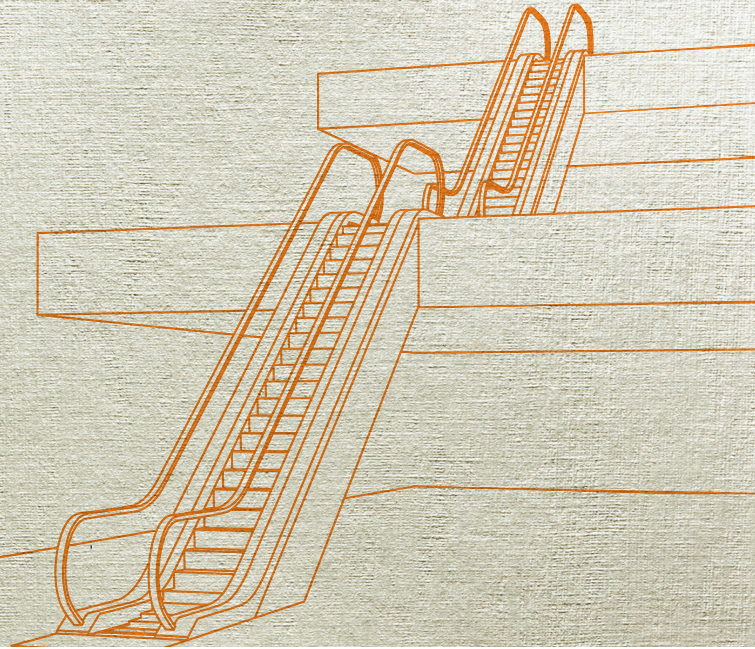
SUPPLY CHAIN PROCESS AND SYSTEMS OPTIMIZATION FOR A LEADING GLOBAL MANUFACTURER OF ELEVATORS, ESCALATORS AND AUTOMATIC DOORS

EXECUTIVE SUMMARY

The client is a leading global manufacturer of elevators, escalators and automatic doors, and is an established SAP user. Around two years ago, they sought a partner to help them realize further benefits and efficiencies from their existing SAP system, and to harmonize and update their applications landscape. HCL was selected to deliver this program.

The client's overall project objectives were to:

- Improve the business processes that were supported by the SAP system by implementing enhanced functionalities

- Ensure the consistent adoption of these improvements through factory-by-factory business-change activities

- Achieve deployment as rapidly as possible to streamline and accelerate return on investment, while recognising that:
  - Each manufacturing site would require significant change management activities to achieve the consistent adoption of improved business processes
  - There are multiple on-going Supply Line (SL) SAP projects (see below) that the QWs project would need to accommodate

- Alignment with the on-going SAP SL Projects is crucial, especially:
  - The SAP Consolidation Project - which migrates three current SL systems in to a single system running the latest version of SAP
  - The SL India Project - which implements SAP into a new factory in India
  - A Big Project - which implements SAP into a new factory in China

HCL's Role:

1. Work with the client to gain a sufficient understanding of the current SL system and QWs requirements.

2. Complete a detailed design of SL QWs changes.

3. Build and test the QW changes. HCL is completing a single build and test for the QWs functionality. This includes localizations for all countries other than China, to minimize regression testing and the impact on the client's resources.

4. A single technical go-live which decouples subsequent business go-lives from any further technical changes from other projects within the production system. This technical go-live will not impact the existing process and solution until it is activated during business go-lives.

5. Work with each manufacturing site to implement the new functionalities, changing current business processes as required.

6. Work jointly with the client's global teams to manage and deliver the project.

ABOUT THE CLIENT

The client is one of the global leaders in the elevator and escalator industry. Committed to understanding the exacting needs of customers over the past century, it provides industry-leading elevators, escalators, and automatic doors together with innovative solutions for modernization and maintenance.

The client's objective is to offer the best People Flow™ experience by developing and delivering solutions that enable people to move smoothly, safely, comfortably and without waiting in buildings in an increasingly urbanized environment.

BUSINESS NEED

- The client's business activities are dependent on component suppliers and supply capacities located in Europe, Asia and North America. The risks related to its supply chain are controlled by analyzing and improving the fault tolerance of processes, forecasting, cooperation with suppliers, and by increasing the readiness to transfer the manufacturing of critical components from one supplier to another.

- Changes in raw material and component prices are reflected directly in production costs. Due to price fluctuations that was impacting profitability, the client wanted to enter into fixed price contracts with its major suppliers.

- Productivity improvement targets are key to the client's business performance. These are managed through proactive planning and forecasting processes, and constant process development through the introduction of new technologies and the outsourcing of certain activities.

- To mitigate these risks and achieve the projected business growth of 6 - 9%, the client required to transform its fragmented manufacturing units, machines, processes and tools, to simple, harmonized, smart and integrated processes and systems.

SOLUTION ELEMENTS

The QWs project targeted a range of process and SAP solution enhancements across manufacturing and supply chain areas.

Manufacturing Solution Highlights

Planning and Forecasting	**Demand Management**
	Introduction of standard SAP Demand Planning which drives the creation of make-to-stock production orders for stocked components based on planned demand and data held in SAP BOMs. This resulted in more efficient sales order production processes since stocked components are already available.
	Forecasting
	Implemented standard SAP Material Forecasting to replace the existing manual process using material consumption history to drive purchasing of externally procured components for stock.
	Capacity Planning and Leveling
	Implemented the solution to automatically create and schedule production orders based on the available capacity in work centers while blocking the ability to create orders where no available capacity exists. This enables the efficient utilization of production facilities and helps fix realistic order completion dates.
	Material Availability Checking
	Created new reporting that identifies production orders where components are not yet physically available. This enables production management / material planners to determine which orders to delay, based on the knowledge of component availability at the required point in the production process.
Production Order Management	**Order Sequencing**
	Improved the integration between SAP and existing production scheduling tools. Passed back production sequencing details to SAP support sequenced printing of the production orders; enabled correct sequencing of items in requisitions for externally procured components.
	Global Production Order Layouts
	Replaced local production order printouts with global standards for each production line type. This reduces the cost and effort to maintain and make changes, and is easier to apply globally.
	Subcontracting
	Enhanced the existing SAP master data to enable SAP Routings to automatically drive subcontract operations within production orders.
Finished Goods Shipment	**Production and Shipment Date Synchronization**
	Improved the visibility of distribution centers. This was achieved through the automatic updating of planned delivery dates in stock transport orders, using planned completion dates from the production orders.
	Shipping of Finished Goods
	Replaced existing bespoke developments with SAP to enable operators in the shipping yard update shipping documents in SAP in real-time, using tablets over Wi-Fi.

Inventory Management	**Physical Inventory Count**
	Implemented the standard SAP cycle counting configuration by plant. This enables count frequency to be assigned to production component materials based on ABC classification. Count documents are generated automatically at the required frequencies.
	Inventory Management Reporting
	Enhanced standard SAP transactions for reporting warehouse stock at IM level by allowing search through fixed bin locations.
Operational Management	**Production Dashboards**
	Implemented SAP Portal-based production dashboards. This enables the use of standard SAP roles for plant managers and production supervisors, providing the capability to view key performance monitors defined in SAP ECC and run predefined reports from ECC and BI directly from the portal.
	End User Instructions
	Produced standard end user instruction documents based on globally defined roles. This replaces locally produced notes based on local interpretations of the processes.

Order Management Solution Highlights:

Order Engineering	**Introduction of Order Engineering Work Bench (OEWB)**
	OEWB is a SAP add-on product. It allows for more efficient, user friendly processing by providing easy assembly, re-use and editing of BOMs. It reduces cost through re-use and versioning, and increases engineering productivity through the efficient and interactive use of previous Sales Order BOMs.
	Use of Networks
	A more flexible way of working with network activities and confirmations via the introduction of activity elements to allow for a further breakdown in work, and allowing for partial confirmations, leading to a more realistic overview of the activities to be done, and their progress.
Re-charging Costs	**Cost Transfer**
	Intelligent use of Resource Related Billing (RRB) allows for the re-charging of cost balances/variances of factory production orders back to the originating (ordering) business units.
Order Management	**Urgency process**
	Implemented a solution that allows certain orders / delivery groups within the orders to be marked for faster processing; providing improved communication throughout the supply chain and back to the customer. This is an integrated set of solution enhancements working across the order management, procurement, manufacturing and logistics areas of SAP.
	Service Invoicing
	Designed a new standard process for the sale and purchase of engineering services between the client's Front Line (FL) and Supply Line (SL) business units. This new process allows for a fully integrated flow from FL purchases to SL sales orders and the resulting purchase invoice, which automatically includes the legally correct input tax code and percentage. This replaces a very manual and non-standardized process.

Order Management (Contd...)	Sales Of Scrap From Factories
	A new process was introduced that allows for the sale of any type of (scrap or unwanted) material to external parties, greatly improving the tracking of these kinds of sales and allowing for reporting and improved communication between the business units involved.

Logistics Solution Highlights:

Stock Process	Stock Plants
	Introduced new configuration to enable the storing of frequently used parts in a storage facility near a factory or distribution center, in turn enabling shorter lead-times for these parts.
Delivery Documents	Printed Outputs
	Enhanced existing bespoke layouts to include additional information, enabling the client to improve their interaction with warehouse or transportation partners.
Partner Integration	Enhanced Integration
	Introduced automatic electronic interfaces for improved integration with external partners, such as warehouse or transportation partners.
Reports	Additional Reports
	Built additional bespoke reports to allow proactive monitoring of IDoc interfaces as well as document integration for some business scenarios, down to the handling unit level.
Transport Consolidation	Improve Automation of Transport Consolidation
	Introduced new configuration to enable an increase in automatic transport consolidation rate between distribution centers, thus lowering cost and CO_2 per unit transported in this way.

Procurement Solution Highlights:

Purchase Order Management	Consistent Confirmation Processing
	Enhanced the standard SAP Purchase Order confirmation process and the standard inbound IDoc to meet the business requirement for COT (complete and on time) reporting on supplier performance.
	Activation of Version History
	Implemented Purchase Order Version History management to enable the business to track changes made to external purchasing documents..
	Purchase Order & Purchase Requisition Process Enhancements
	Added new fields to the SAP Purchase Order. Requested shipment date provides instruction to the supplier as to when to have the materials ready to ship where a client is responsible for its transportation. Actual shipment date comes from the inbound delivery to help the business analyze supplier performance.
	The Purchase Requisition was enhanced to support urgent order information regarding urgent customer requirements, which now flows from the sales order to procurement. It is then shared externally to suppliers, and internally with the downstream manufacturing and logistics functions.
	Purchase Order Output Improvements
	Outputs were enhanced to incorporate information including the PO version number, requested shipment date, and the urgency indicator on print and EDI outputs.

Purchase Order Management (Contd...)	Purchase Order & Sales Order Status Reporting
	New comprehensive reporting was developed to provide key purchase related information that a user may need in managing the PO process effectively.
Vendor Management	Subcontracting Process Improvement
	User documentation was created to establish the consistent use of standard SAP subcontracting processes.
	Improved Vendor Selection Functionality
	Coding was optimized to reduce the run time of an existing bespoke program that selects suppliers for MRP generated requirements.
Material Requirements Planning	Improved Use of MRP
	User documentation was created to provide consistent business understanding of how the standard SAP MRP functionality is used to support the client's operational processes.
Managing Delay Risk	Delay Risk Functionality
	Provided an enhancement to identify and report on all purchase order items already delayed or at risk of being delayed. This enabled impact assessment on subsequent production and order fulfilment activities, and appropriate resolution actions could be taken.

OUTCOME

The following table summarizes the key benefits arising from the QWs project.

Planning and Forecasting		
Existing Situation	Project Improvement	Tangible Benefit
Almost all in-house manufactured components are made to order	SAP Demand Planning was used to drive the production of frequently used components on a 'make to stock' basis	Improved capacity and resource utilization by building a smooth demand plan rather than against uneven sales order demand
Manual spreadsheet forecasting process for externally procured components	SAP Material Forecasting used to drive external component procurement	Time saved and accuracy improved for automated forecasting
Various non-SAP scheduling tools used to plan production - tools and approach were different per site	SAP production order scheduling based on available capacity in work centers	Improved capacity and resource utilization through better visibility and the ability to amend future production schedules
Manual processes to identify released production orders where components are not available; determine resolution	SAP report developed to identify production orders where components are not available or expected in time, for planned production execution	Avoidance of production delays due to missing components
Production Order Management		
Existing Situation	Project Improvement	Tangible Benefit
Production Order papers manually separated and distributed to work centers	Production Order papers automatically printed in production sequence	Reduced manual effort in collation of Production Order papers

Production Order paper layouts and different content per site	Global standard Production Order papers per factory line type	Reduced IT maintenance costs
		Improved ability to make global changes
Manual determination of external subcontract operations within production orders	Use standard SAP Routings to automatically drive subcontract operations	Reduced manual effort.

Inventory Management		
Existing Situation	**Project Improvement**	**Tangible Benefit**
Manual inventory counting schedules with exceptional counts when discrepancies were identified.	Standard SAP cycle counting with schedules determined based on ABC classification of materials.	Better resource utilization. Reduced manual effort.

Operational Management		
Existing Situation	**Project Improvement**	**Tangible Benefit**
Standard SAP reports used but dependence on individual managers' SAP reporting competency	Implement portal based production dashboards giving user friendly web based reporting solution	Reduced management effort to get reporting due to push reporting and alerts capability
Locally produced and handed down SAP user instructions	Standard user instructions produced for globally defined business roles	Improved continuity planning Better employee competence Improved process adherence
Multiple reports needed to get information to manage purchase order processing	Comprehensive status report developed to provide all key information in one place	Cost saving through reduced effort to obtain the required information
No easy way to identify purchase orders that are at risk of being delayed	New reporting identifies purchase orders delayed or at risk of delay enabling timely resolution actions	Reduced production costs due to the ability to avoid scheduling orders with missing parts Improved customer satisfaction by resolving issues before they lead to missed delivery dates

Order Engineering		
Existing Situation	**Project Improvement**	**Tangible Benefit**
Bespoke development for copying Sales Order BOMs for re-use	Implemented SAP Order Engineering Workbench add-on with additional requested enhancement	Cost saving through reduced engineering effort in setting up complex orders

Order Management		
Existing Situation	**Project Improvement**	**Tangible Benefit**
Urgent customer orders need manual/email intervention to ensure that all departments are aware of customer delivery date requirements.	Urgency process enhancements implemented to provide integrated information in SAP documents and outputs across the supply chain.	Cost savings through reduced manual coordination efforts. Improved customer satisfaction by achieving required dates for urgent orders/components.
Sale and purchase of engineering services between FL and SL business units are executed differently on a case by case basis, frequently requiring correction to input tax codes	New, standardized process implemented, resulting in correct input tax determination, and providing a much more standardized way of handling the sale/purchase of services	Configuration driven determination of correct input tax codes in FL countries across the world Correct usage of withholding tax for services while keeping goods purchases as-is More integration between FL and SL reduces the chance of data entry errors Improved reporting opportunities

Stock Process		
Existing Situation	**Project Improvement**	**Tangible Benefit**
Frequently used products are ordered individually per sales order from the relevant factory or supplier	Stock plants configured to enable frequently used parts to be stored close to factories or distribution centers	Reduced lead time

Transport Consolidation		
Existing Situation	**Project Improvement**	**Tangible Benefit**
No system solution in place to support easy consolidation of transport between distribution centers	New SAP configuration to enable increased transport consolidation rate between distribution centers	Lower transport costs and CO_2 emissions per unit due to fewer large deliveries

HCL ACCELERATORS

Deployment Control Table

In standard SAP, when an ABAP development is transported to production, it will be available for all organizational units. Due to the QWs project being rolled out by country and factory, this does not provide the appropriate level of control.

To overcome this challenge, HCL developed a Deployment Control Table within SAP, and a transaction maintains it.

For QWs developments classified as being deployed via the Control Table, additional coding was created to check the Deployment Control Table whenever the program is executed. This coding ensures that the selected organizational units are active for QWs before processing is done.

UNIQUE PROPOSITION

After meeting the client and discussing the program requirements, HCL provided a pragmatic and unique solution, with a series of advantages. HCL

- Proposed a highly experienced blended team of European, Indian and offshore consultants

- Proposed a team with deep manufacturing understanding

- Demonstrated its unique SAP global roll-out experience

- Minimized regression testing and the impact on the client's resources through upfront localization designs

- Proposed an approach which had the effect of decoupling the programme from multiple parallel in-flight SAP programs

- Provided a much needed clear stabilization period for parallel programs of change to be re-looked at

- Increased the implementation speed to:
  - Minimize the impact of changing business requirements during deployment
  - Reduce time to benefit

- Minimized business change by staggering business go-lives

- Proposed controlling the technical deployment which ensured that the business change impact was also under our control

- Implemented more quickly than the client expected, without increasing risk

OPPORTUNITY/ CHALLENGE

Although the client is an established user of SAP, the use of the system within its factories

varies widely. This is due to multiple factors including end user and key user understanding of standard SAP capabilities, master data set up, and the different throughput characteristics at the various factories. For example, there are low volume, high value production lines building highly customized products, and high volume lines building more standard product solutions.

A key challenge for the QWs project was to establish the better use of standard SAP processes whilst harmonizing factory business processes. The objective was to facilitate:

- Improving user understanding of standard SAP capabilities

- Extending SAP capabilities to reduce the number of offline/spreadsheet based processes

- Developing specific enhancements to address the scheduling needs of higher volume production lines

- Process harmonization

TECHNICAL DESIGN

Implement additional standard SAP capabilities including:

- Demand Management

- Material Forecasting

- Inventory Cycle Counting

- SAP Portal based Production Dashboards

Enhance use of SAP master data to support increased use of standard SAP processes like:

- Restructuring variant configuration data to standardize production order structures, facilitating easier order rescheduling
- Using routings to drive sub-contract operations
  - Develop functional enhancements to support specific client requirements or enable the replacement of bespoke, non-SAP systems, including:
- Order re-scheduling enhancement to enable production orders to be advanced or delayed to fill capacity
- Shipping assistant application to replace the existing non-SAP developed application

TECHNICAL SOLUTION

Order Re-scheduling Enhancement

The client is required to move approximately 20% of orders to ensure that capacity is utilized to meet the current and expected demand situation in the planning window. This requires that sales order items that are MRP relevant, but not yet released, are identified and replaced with future orders that are released.

The standard SAP Planning Table does not meet this requirement for mass re-scheduling of planned orders (forwards or backwards) to fill the available capacity based on the order status. Therefore, an enhancement was required.

The benefit of this enhancement is that planned orders will be available on the planned production date, to fully utilize capacity. These orders can then be dispatched automatically or via the planning table. Without this enhancement, manual processing of individual orders would be required to fill capacity, and this is impractical in high volume factories.

Shipping Assistant

This development replaces a non-SAP-based bespoke application. The functionality includes:

- The ability for a mobile shipping operator to select the truck (shipment document) that is to be loaded
- Entering or scanning a handling unit (HU) number and immediately performing data checks against the HU number

Once the loading of a truck is completed, the operator clicks a button to confirm the completion of the truck loading activity. This triggers further data checks and if all is okay, results in assigning the relevant outbound delivery document(s) to the shipment document.

The solution is operated directly from fork lift trucks in the shipping yard using the standard SAPGUI on a tablet computer.

OPPORTUNITY/ CHALLENGE

The client's order engineering (OE) process runs over a long period with much iteration until the customer's requirement is fully met. Building a bill of materials for a product which is designed through an OE process can become an iterative, time consuming, and cumbersome job for the engineers.

The SAP add-on tool Order Engineering Work Bench (OEWB) enables the engineers to create and modify the Order Bill of Material (OBOM) more conveniently and quickly.

The general business phases of the order engineering process are illustrated below.
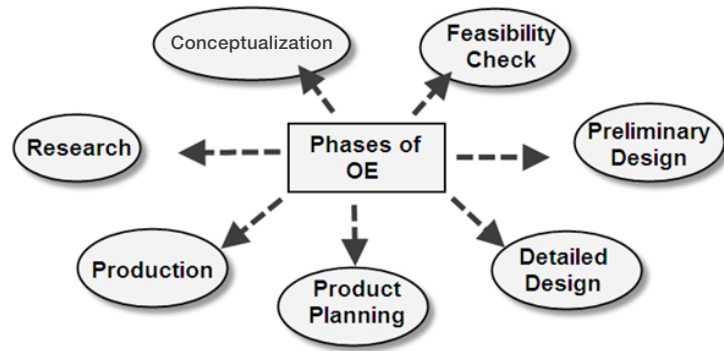
The most important elements of OEWB are:
• Reconfiguring Order BOM
• Copying BOM items
• Copying Non-Dependable Characteristic Values
• Changing items in Order BOM
• Displaying Material
• Version Control

TECHNICAL SOLUTION

This included implementing the SAP OEWB add-on product. Following an evaluation of the OEWB jointly by the client and HCL, it was identified that a facility to select multiple BOM items and copy them concurrently was missing from the add-on. It was then agreed that SAP would develop this enhancement for the client and include it as an extension to the OEWB add-on product.

OPPORTUNITY/ CHALLENGE

In some cases, the client's standard lead times will not meet the delivery dates set by the customer. In these instances, the client may offer its customer a premium service whereby specific engineering activities, sales order items or whole sales orders are fast-tracked. This is known as the Urgency Process.

An overview of this process is shown below:

Urgency process overview
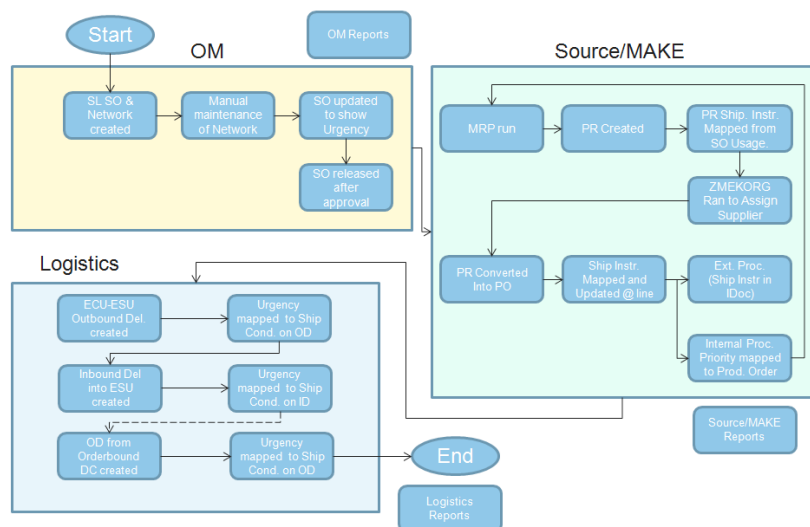
The process of enabling all of the inter-related steps (illustrated in the diagram) on an exceptional / urgent basis used to rely on manual interventions spanning multiple departments.

The challenge was to enable the Urgency Process to be initiated in the Order Management system with the relevant urgency indicators being automatically passed to the downstream operations in procurement, manufacturing and logistics. Updates to existing operational reports and business documents such as Purchase Orders and including the new Urgency indicators in these documents were required, to seamlessly manage the Urgency Process through the organization, and with external partners.

TECHNICAL SOLUTION

A combination of SAP configuration and bespoke enhancement to hold, pass on, and report on the new urgency indicators was required, to deliver an integrated and automated process solution.

Contact: iSCM@hcl.com

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