Transforming Steel Pipe Supply Chain using Integrated Business Planning Systems

Jindal SAW Limited
P.R.Jindal Group, India

Chandan Sinha
Chief Information Officer
4th INTERNATIONAL SAP METALS & MINING SUMMIT
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The USD 18 billion O.P. Jindal Group has an asset base of USD 25 billion and human asset base of more than 70,000 people.

**O P Jindal Group - Brief profile**

<table>
<thead>
<tr>
<th>JINDAL SAWS LTD.</th>
<th>JSW</th>
<th>JSLN</th>
<th>JSPL</th>
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</thead>
<tbody>
<tr>
<td><strong>✓ Saw Pipes</strong></td>
<td>✓ Crude Steel</td>
<td>✓ Stainless Steel</td>
<td>✓ Crude Steel</td>
</tr>
<tr>
<td>✓ Largest line pipe producer in India and 2nd largest in Asia (excluding China)</td>
<td>✓ Flat Products</td>
<td>✓ Flat Products</td>
<td>✓ Flat Products</td>
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<tr>
<td>✓ Ductile Iron Pipes</td>
<td>✓ Long Products</td>
<td>✓ Long Products</td>
<td>✓ Long Products</td>
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<tr>
<td>✓ One of the largest player in DI pipes, manufacturing facilities in India, UAE and Europe</td>
<td>✓ Coated Products</td>
<td>✓ Ferro Alloys</td>
<td>✓ Sponge Iron</td>
</tr>
<tr>
<td>✓ Seamless Pipes</td>
<td>✓ Coal &amp; Gas based Energy</td>
<td>✓ Flat Products</td>
<td>✓ Ferro Alloys</td>
</tr>
<tr>
<td>✓ Among major player in Seamless pipes segment in the Country</td>
<td>✓ Cement</td>
<td>✓ Energy</td>
<td>✓ Energy</td>
</tr>
<tr>
<td>✓ Iron Ore &amp; Pellet</td>
<td>✓ Coal &amp; Gas based Energy</td>
<td>✓ Iron Ore Mines</td>
<td>✓ Iron Ore Mines</td>
</tr>
<tr>
<td>✓ Fully Integrated facility at Mine Head for Beneficiation, Pallet and Steel in Bhilwara (Rajasthan)</td>
<td>✓ Cement</td>
<td>✓ Pellets</td>
<td>✓ Pellets</td>
</tr>
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www.jindalsaw.com/

www.jsw.in/

www.jindalstainless.com/

www.jindalsteelpower.com/
Jindal Saw: Diversified Product Offering

Emerged from a single product to a multi-product enterprise with its products finding applications in oil & gas, water, energy, petrochemicals, engineering, transportation etc.

- **SAW Pipes**
  - **Applications**
    - Oil & Gas, Sea Water & Transportation
  - **Capacity (MTPA)**
    - ~8,00,000 (India); Double Jointing and Anti Corrosion Coating (TX, USA)
  - **Key Differentiator**
    - Used under high pressure conditions
    - Demand directly related to investments in Oil & Gas sector

- **Helical SAW**
  - **Applications**
    - Oil & Gas Transportation; Water Transportation
  - **Capacity (MTPA)**
    - 740,000 (India); 100000 (JTIL)*
  - **Key Differentiator**
    - Used under low pressure conditions
    - Demand directly related to investments in Oil & Gas sector and water projects

- **Seamless Tubes/Pipes**
  - **Applications**
    - Petroleum, Exploration; General Engineering, Boilers, Automotive
  - **Capacity (MTPA)**
    - 2750,000 (India); Drill Pipe, Helical Anchor, Tool Joint, Forging (TX & MN, USA), Stainless seamless and welded tubes
  - **Key Differentiator**
    - Wide application in oil related and non-oil industries

- **Ductile Iron (DI) Pipes**
  - **Applications**
    - Water Transportation; Sanitation & Housing
  - **Capacity (MTPA)**
    - 450,000 (India); 3,00,000 (UAE); 50,000 (Italy)
  - **Key Differentiator**
    - Ductile is rapidly replacing Cast Iron steel pipes

Diversified product offering with none of its business segments contributing more than 25-30% of the total revenue
Jindal Saw : Introduction

Leading Pipes Manufacturer with Global Presence

- One of the largest pipe manufacturer (by capacity) globally – app. 2.9 million MTPA
- 3rd largest producer of water pipes (DI) in the world.
- Only Producer in the world - Offering “Total Pipe solutions” including SAW Pipes, Ductile Iron Pipe and Seamless Tubes.
- Dominant position in energy sector and water sector in India
- Strong Manufacturing & Marketing presence in US, UAE, Europe besides India.

Diversified multi-product producer

- Produces LSAW pipes, HSAW Pipes, Ductile Iron Pipes, Seamless Pipes and External & Internal Coatings.
- Backward integration to Iron Ore Mines, Pellet and Steel

World-class customer base

- Customers include leading players in Oil & Gas, Water Infrastructure Projects, Transportation of Fluids, Boilers, Automotive industry, Steel.
- Global clients roster include, among others, Shell, Chevron, BHPB, Bechtel, Delhi JAL Board, TRISTAR, Lindenberg, Galfar, Questar, PDO, Oman Gas, Gulf South and Saipem, Petronet, Saudi Aramco, British Gas, GASCO, ADCO etc..
- Order book of India –app. USD 1100 Million – Exports approx. 30%.

Diversified Revenue Profile

- Revenue contribution from; Water Sector – 47%, Oil & Gas Sector – 36%, Industrial & others– 18%

Financial Strength

- Promoters – Mr. P R Jindal – Industry leader with strong financial strength
- Long Term Debt Rating of AA with stable outlook, A 1(+) for short term financing

Multi Product : Multi Locational : Mutli National
Global Customer Base

Marque customer base across a wide range of sectors and geographies.

<table>
<thead>
<tr>
<th>Domestic</th>
<th>International</th>
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<td>IndianOil</td>
<td>British Gas</td>
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<tr>
<td>ONGC</td>
<td>Questar</td>
</tr>
<tr>
<td>PetroNet</td>
<td>CenterPoint Energy</td>
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<tr>
<td>Petroleum</td>
<td>Overthrust Pipeline</td>
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- Over 30 years of experience in providing SAW pipes to the oil & gas, water sector - caters to top tier oil & gas and EPC companies in India and overseas
- Strong presence in the export market.
- Preferred supplier to global clients due to its stringent quality standards certified by the American Petroleum Institute and other International Standards.
- Building customer relationships over time and successfully generated repeat business
Supply Chain Management Initiative with SAP
Business Requirements

- Forecasting, RCCP, Inventory planning, RM Planning, Product Mix Simulations
- Long and mid term view driven by Analytical insights and tracking of key benchmark KPI’s
- Single plan and balancing of objectives collaboratively between Marketing, Commercial, PPC, Business heads.

- The bottleneck capacity situation should be available to marketing and system should give a suggested ATP (Promise Date) for an Order
- Simulations to take a high priority order and its impact on the due date of existing orders. Minimize late penalties and improve agility
- Get single set of planning numbers for all stakeholders in a single system

- Production planning considering the constrains and rules of Capacity, Molds, Raw Material, lot sizes
- Should be flexible to handle the differences in DI/Seamless/Large Dia/Pellets/Fittings planning
- Ability to handle metal industry nuances- Automatic clubbing based on machine parameters and the order parameters

Key Capabilities needed

- Sales and Operations Planning with Simulations
- Analytics/ KPI’s and Collaboration
- Financial and Operational optimization

- Sales Order Capture and ATP
- Commercial workflows and visibility
- Simulations and prioritization

- Constrained Production planning and scheduling
- Raw Material plan linked to production
- Integrated Process & Systems
Supply Chain Management – Project Objectives

- **Business / Sales Plan** – Finalization, Review and Modification with various dimensions
  - Business Vertical (Seamless, Stainless etc.)
  - Time Period (Year, Quarter and Month)
  - Customer Category (Export, Domestic, Geography, Zone etc.)
  - Sales Group (PSU, OEM, Trader etc.)
  - Product Family (Hot Finish, Cold Finish, API)
  - Product Segment (Bearing, Hydraulic Cylinder, Alloy Boiler etc.)
  - Customer level

- Promise date for Made-to-Order
  - Sales Team to commit Order Delivery Dates at the time of confirming an Order
  - This requires backward Planning with time-to-produce and lead times etc
    - Finished Goods ➔ SFG ➔ Raw Material
    - Netting off free Material Availability (FG, SFG at all levels and RM)
    - Available Capacity, Alternate Routings
    - RM procurement lead time

- **Sales Order – Approval Process**
  - Marketing Head
  - Quality
  - Finance

- **Post order Production Planning process**
  - Generate Planned Order for FG, SFG at all levels
  - Alerts if RM not available ➔ to raise PR & PO
  - Production Plan visibility on planning / Dash Board
  - Planned Order assignment based on raw material availability.
  - Billet Cut / Coil Slitting Optimization
  - Tracking of Production through a Pipe Tracking System
    - As per routing
    - For Each Cluster of Work Centre
    - Recording of Prime, Rejects and Scrap
    - Declaring Inventory (SFG, FG) basis
      - Quality Inspected/pending
Solution components for Supply Chain Management

Year / Quarter / Month
Sales and operations Planning (SAP IBP)

Months / Weeks
Global Available to Promise (SAP-GATP)

Month / Week / Day
Production Planning and Detailed Scheduling (SAP PPDS)

Real-time
ECC on Suite on HANA
### Key Focus Areas by SAP Modules

<table>
<thead>
<tr>
<th>SAP Module</th>
<th>Focus Areas</th>
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| **S&OP** | • Assessing unconstrained Sales Volume – How much can JSAW sell if there are no back-end constraint  
• Overlaying critical supply capacity constraints, thereby arrive at a constrained sales plan  
• This Output to be used to drive order promising |
| **GATP** | • GATP Simulations with S&OP created allocations  
• S&OP output will be used to feed allocation metrics that will drive order promising |
| **PPDS** | • Planning Ready SAP System  
• Production Plan considering RM/WIP availability and Lead time constraints  
• Visibility of capacity bottlenecks basis the production load  
• Increased granularity in Production plan based on improved product definition and execution process  
• Integrated planning for FG, SFG and RM  
• Resolution of capacity bottlenecks  
• Order clubbing based on characteristics / attributes and streamlined resource loading  
• Synchronized plan and schedule across stages of production |
Workflow Envisaged post Year / Quarter / Monthly planning

**Process Flow**

<table>
<thead>
<tr>
<th>ECC/GATP/IBP</th>
<th>ECC</th>
<th>PPDS</th>
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<tbody>
<tr>
<td>1. Customer Requirement (Sale Order)</td>
<td>2. Financial Clearance</td>
<td>3. Production Planning &amp; Scheduling</td>
</tr>
<tr>
<td>ECC</td>
<td>PPDS/ECC</td>
<td>PPDS/ECC</td>
</tr>
<tr>
<td>ECC</td>
<td>ECC</td>
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**Enablers**

**WORK ENVIRONMENT**
- HARMONIOUS
- INTEGRATED
- TRANSPARENT

**TOOLS**
- TECHNOLOGY
- PROCESSES
- INTERVENTION

**ROLES**
- Collect & Process Data
- Disseminate information
- Observe & Discuss bottlenecks
- Implementation of Business Plan
- Stores Management
- Cost Control
- Feedback & Reporting
Supply Chain Management - Approval Process ECC

1. Customer Enquiry
2. Dummy Sales Order
3. Approval (Price, Grade etc.)
4. GATP
5. Quotation
6. Customer PO
7. Final Dummy Sales Order
8. Approval (Price, Grade etc.)
9. GATP
10. Customer PO Confirmation
11. Actual Sales Order with reference to FDSO
12. PPDS
Supply Chain Management - PPDS Design for Seamless

Cut Billet Requirement → Piercer → Hollow → API → Cold Finish → Delivery Quantity And Delivery Date As per Sales Order Line Item

Clubbed Hollow Requirement → Hot Finish

Transformation from Complicated SFG and RM planning from Excel to PPDS

Two Plants & Alternate Production Lines
Gaps in SAP needing Customisation

Seamless Pipe Division
- Clubbed Hollow requirement as per Sales Order
  - Material Grade
  - OD & Thickness
  - Length
- Cut Billet requirement

Stainless Pipe Division
- Slit Coil planning
- Mother Coil Slitting Plan
- Mother coil procurement plan as per multiple sales orders
Gaps in SAP needing Customisation

Seamless Pipe Division - Hollow & Cut Billet Optimization

Raw Billet

Cut Billet (OD 160MM) Length ???

Hollow (OD 88.90MM) (Thickness 17.05MM) Length ???
Charge 5.3 Meters
After CFS with two Draw 10.60 Meters
2 Cuts would give 5.3 CFS Tubes (OD 61.00MM) (Thickness 12.3MM) (Length 5 Meter)

Stainless Pipe – Mother coil planning

Sales Order
➢ Grade: 30400
➢ Thickness: 3.5mm
➢ DIA:129mm
Sales Order + Line Item is sorted in ascending order of DIA required

Search for Slit coil
➢ Grade: 30400
➢ Thickness: 3.5mm
➢ DIA:129mm ~ <= 140mm with selection on least remainder (Rounded up 10mm)

Mother Coil Slitting Optimization (minimize scrap)
➢ Grade: 30400
➢ Thickness: 3.5mm
➢ Width: Largest First for Net Requirement
Key Success Factors

- Strong stakeholder and senior management commitment
- Risk identification early in project and mitigation strategies
- Manageable and realistic scope of project
- High performing team (JSAW, SAP and IBM) and synergies
- Business benefit focus
- Gap resolution approaches on the project
- Full time availability of core team for design, training and testing.
- Dynamic Changes in requirements - to be avoided
<table>
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<tr>
<td>Streamlined Yearly / Quarterly / Monthly planning process with S&amp;OP getting established</td>
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<td>Integrated production planning through system leading to less people dependency</td>
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<td>Capability to promise and deliver order on time</td>
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<td>Integrated Sales order supply chain with least manual interventions</td>
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<td>The key process gaps have been customized on same SAP platform leading to less complexity of maintaining another system</td>
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<td>Expected improvements in plant utilization and EBITDA margins once roll outs are complete and shift happens to next maturity level</td>
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Digital Transformation Journey with SAP and way forward

Journey Till Now

- 2009: Jindal SAW signed SAP contract to initiate ERP
- 2011: SAP ERP implementation went live
- 2014 Onwards: Live on Suite on HANA
- 2018: Live on IBP, PPDS, GATP
- 2019: Jindal SAW signed HANA(SoH) & SCM contract
- SAP roll out to Plants and other group companies

Analytics Initiative
- SCM Roll out to other businesses and shift to next maturity level
- Plan to deploy S/4 HANA
- Build further on Supply chain foundation

Next phase of digital Journey
Thank You