

## Overview of Optiflow-Le Operations Execution System

Optiflow-Le's proprietary constraint based detailed scheduling & sequencing engine forms the core of OE system.

Unlike traditional scheduling systems, a detailed scheduling system provides detailed description of materials, components and work-in-progress requirement at the operational level, at specified intervals, and this information is updated across the value chain.

DPSS systems can pin-point location of material and WIP at any point. They also provide a detailed dispatching sequence. They provide all the necessary details you need to synchronize plant with rest of the value chain.

DPSS systems, by default, target 'maximum capacity utilization'. They are built for repeated scheduling tasks. Also provide various KPI's.

### **Architecture**

**Process Based Platform**

**Seamless adoption of Lean Methodologies**

**Supply Chain Optimization**

**Warehousing & Distribution Optimization**

**Constraint based detailed Scheduling & Sequencing System**

**Equipment Maintenance**

**Performance Tracking**

**Product Data Management**

**Real-time Factory Intelligence**

**Data Acquisition**

**Plant-to-Enterprise Integration**



## Seamless adoption of Lean Methodologies

Optiflow-Le comes with built-in support for Lean Methodologies. Lean practices are enforced by default.

Supports Unit Processing, Batch Processing and Kanban Processing (any quantity in-between unit and batch known as Kanban Loop Quantity ; Toyota Production System).

Value Stream Maps (VSM) are presented in real time as Kanban Replenishment Sequence, Material Replenishment Sequence and Finished Goods Pull Sequence.

Srl	Current Operation	Change-Over / Cooling Time (hh:mm format)	Kanban / Loop	Next (successor) Operation
1	Drawing		56130	Bunching/Stranding
2	Bunching/Stranding		8000	Insulation
3	Insulation		8000	Assembly
4	Assembly		2000	Filling
5	Filling		2000	Armouring
6	Armouring		2000	Sheathing
7	Sheathing		2000	EndOfProcess

Please refer 'Overview of Lean Planning & Operations' for a detailed discussion.

## Supply Chain Optimization & Synchronization

Material Replenishment Sequence provides date, time and quantity of material requirement at the plant floor.

Optiflow-Lelc provides the mechanism to automatically update this information across the supply chain and other related systems.

Changed plans are brought to the notice of all concerned as a part of the early-warning-system.

Srl	Date	Order / Job	Operation	Rep. Date-Time	Rep. Qty.	UoM	Start To-Date
		PVC INSULATION 01	INS-PVC-01				
2	27/11/2009	LOW VOLTAGE CABLE JOB ID. ONE	Insulation PN-AL85-PVC-INS	27/11/2009 - 11 : 59	8,800.00	Mtrs.	8,800.00
		STEEL SHEETING CABLE TYPE ONE	CAB-SH-01				
3	24/11/2009	MED VOLTAGE CABLE JOB ID. TWO	Sheathing PN-AL105-SHEETED	24/11/2009 - 08 : 28	13.20	Nos.	13.20
4	30/11/2009	LOW VOLTAGE CABLE JOB ID. ONE	Sheathing PN-AL85-SHEETED	30/11/2009 - 10 : 39	8.80	Nos.	22.00
5			Sheathing PN-AL85-SHEETED	30/11/2009 - 11 : 59	0.00	Nos.	22.01
		Filling Gel	Filling Gel				
6	28/11/2009	LOW VOLTAGE CABLE JOB ID. ONE	Filling PN-AL85-FILLED	28/11/2009 - 09 : 53	2.20	Kgs.	5.50
		Armour Tape 4	AD T 4				

This information can be effectively used for optimizing and synchronizing material / component / part supplies. At the same time, is also effective in eliminating 'stock-outs'.

## Optimization of Warehousing & Shipping Operations

Finished Goods Pull Sequence provides information on quantities available for dispatch at given intervals.

To synchronize inventory buffers, all you need to do is to supply the required kanban loop quantity to the last process and schedule with backward allocation.

Required inventory buffers can be always maintained.

Srf	Date	Order / Job	Operation	Time hh:mm	Finished Buffer	Remarks
1	24/11/2009	MED VOLTAGE CABLE JOB ID. TWO	Sheathing PN-AL105-SHEETED	12 : 28	4,317.00	
2				16 : 28	8,633.00	
3				20 : 28	12,950.00	
4	25/11/2009			00 : 30	17,266.00	
5				04 : 30	21,583.00	
6				08 : 30	25,899.00	
7				12 : 18	30,000.00	
8	30/11/2009	LOW VOLTAGE CABLE JOB ID. ONE	Sheathing PN-AL85-SHEETED	14 : 39	6,000.00	
9				18 : 39	12,000.00	
10				22 : 39	18,000.00	
11				23 : 59	20,000.00	
12	09/01/2010	Single Core Cable Job Id. Three	Coiling PN-D-MH-85-AL	06 : 00	9,203.00	Extra Time of

Process of dispatching can be taken beyond maintenance of inventory buffers. Packing, Shipping and Transportation can be added as processes. In this case, transportation becomes the last process. By scheduling with backward allocation and in conjunction with Finished Goods Pull sequence, your entire delivery operations can be optimized and synchronized with the plant floor. Please refer Optiflow-Le documentation for details.

## Constraint based detailed Scheduling & Sequencing System

Optiflow-Le comes with its own proprietary Constraint based detailed Scheduling & Sequencing engine. We are proud to state that, this engine is quite powerful and allows you to do all sorts of things.

You can schedule for Finite Capacity or Open Capacity with forward or backward allocation, for a given shift or all shifts, or any combination thereof.

Facilitates scheduling for Unit Processing or Batch Processing or Kanban Loops (TPS). Sequencing system is quite flexible and you can have one-to-one, one-to-many and many-to-one operational sequences and routings. Many-to-many is also possible in a round-about manner.

You can have as many overlapping shifts as you like.

Order	Job / W.O.No.	Start Date	Prio rty	Mac Set-Up	Finish Date	Enable F C S	Enable B W S	Assign to Shift	Ignore W I P	Ignore W-H	Ignore O-H
LOW VOLTAGE CABLE	JOB ID. ONE	8/11/2009 00:01	1	N	30/11/2009 23:59	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
MED VOLTAGE CABLE	JOB ID. TWO	8/11/2009 00:01	2	N	30/11/2009 23:59	<input checked="" type="checkbox"/>					
Single Core Cable	Job Id. Three	20/11/2009 22:00	3	N	8/1/2010 06:00	<input checked="" type="checkbox"/>		Third			

Variable Sequential Set-Up    Clear All References    Edit Start-Finish Time    Save Scheduling Options

Select the Shift, if any. Defaults to 'ALL'  
To assign the job to a particular shift, click to select from the drop down list. Leave it blank for 'ALL' shifts.

You can assign orders to specific shifts, including split shifts ( shifts that span two days) or 'ALL' shifts.

You have six constraint handlers. Combinations of these handlers allows you to handle most constraints.

You can specify 'set-up' time per operation / per job / per sequence.

Optiflow-Le also includes a powerful Workforce Planning, Scheduling and Tracking system.

Here again, you can have as many Categories, Divisions and Shifts as you need.

Also facilitates selective workforce substitutions.

It just takes a single click to assign operators.

Includes a powerful tracking system.

Srl	Operation	Operator	Resource	Srl	Schedule
1	Drawing	S1 Operator - 13	MM-85 Cu	1	S1 27/11/2009 08:40 - 27/11/2009 13:20
2	Bunching/Stranding	S1 Operator-19 S2 Assistant - 8 S3 Assistant - 3	DT-1250	1	S1 27/11/2009 08:10 - 27/11/2009 14:00 S2 27/11/2009 14:00 - 27/11/2009 22:00 S3 27/11/2009 22:00 - 27/11/2009 23:58
3	Insulation	S1 Operator - 14 S2 Assistant - 5 S3 Operator - 11	NexTron LP-120	1	S1 27/11/2009 11:59 - 27/11/2009 14:00 S2 27/11/2009 14:00 - 27/11/2009 22:00 S3 27/11/2009 22:00 - 27/11/2009 23:59
4	Assembly	S1 Operator - 12 S3 Assistant - 2	ST-1600	1	S1 28/11/2009 06:00 - 28/11/2009 10:59 S3 27/11/2009 22:58 - 28/11/2009 06:00
5	Filing	S1 Operator - 13 S2 Operator - 16	NexTron LP-150	1	S1 28/11/2009 09:53 - 28/11/2009 14:00 S2 28/11/2009 14:00 - 28/11/2009 20:47
6	Annouring	S1 Operator-19 S2 Operator-24 S3 Operator - 1	ST-1600	1	S1 30/11/2009 11:00 - 30/11/2009 14:00 S2 28/11/2009 14:00 - 30/11/2009 22:00 S3 28/11/2009 22:00 - 30/11/2009 23:58
7	Sheathing	S1 Assistant - 9 S2 Assistant - 6 S3 Operator - 11	NexTron LP-150	1	S1 30/11/2009 10:39 - 30/11/2009 14:00 S2 30/11/2009 14:00 - 30/11/2009 22:00 S3 30/11/2009 22:00 - 30/11/2009 23:59

Please refer 'Overview of Planning & Operations' for a detailed view of the scheduling engine, constraint handlers and workforce scheduling & tracking.

## Equipment Maintenance

In any manufacturing facility, preventive maintenance is important, at times, critical.

Our maintenance management module provides an easy-to-use interface to plan, schedule, track, manage and report maintenance tasks. Includes equipment, fleet and facility maintenance.

An equipment can be any resource; machinery, fleet of vehicles, buildings, estates ..... any asset.

Comes with separate modules for maintenance tracking and breakdown reporting.

Optiflow-Le :: Maintenance Scheduling

Buttons: Check, Schedule, Exit, Reset, Abort

Options:  Select ALL,  Repeat Mac Serials,  Repeat Start-Finish Time,  Ignore Holidays

Equipment: CCV Line | Date From: 23/11/2009 | Date To: 30/11/2009 | Start | Print

Day	Date	Select	Serial From	Serial To	Start Time (HH:MM)	Finish Time (HH:MM)	Serials Not Available
Mon	23/11/2009	<input checked="" type="checkbox"/>	1	1	01:55	02:45	1
Tue	24/11/2009	<input checked="" type="checkbox"/>	1	1	01:55	02:45	1
Wed	25/11/2009						
Thu	26/11/2009	<input checked="" type="checkbox"/>	1	1	01:55	02:45	1
Fri	27/11/2009	<input checked="" type="checkbox"/>	1	1	01:55	02:45	1
Sat	28/11/2009	<input checked="" type="checkbox"/>	1	1	01:55	02:45	1
Sun	29/11/2009						
Mon	30/11/2009	<input checked="" type="checkbox"/>	1	1	01:55	02:45	1

Summary: 23/11/2009 Srl : 1 Overlaps with MnTn #2  
 24/11/2009 Srl : 1 Overlaps with MnTn #2  
 26/11/2009 Srl : 1 Overlaps with MnTn #2  
 27/11/2009 Srl : 1 Overlaps with MnTn #2

## Performance Tracking

Performance tracking includes OEE, OLE, Overall Capacity Utilization, Overall Performance, Quality, Rejects & Reworks, Planned down time, Un-planned downtime, Set-Up time and Capacity Utilization ... and many more.

All these and other performance metrics can be tracked for a given period of time.

Optiflow-Le :: Factory Intelligence :: Evaluation

Menu: File, Processes, Schedules, Equipment, Capacities, Workforce, Kanban, WIP, Costing, Asset Mgmt, PDM, Forecast, User, SetUp, Servers, History, Help

Navigation: Prod. Schedule, Planning Board, Variance, Kanban Full Seq., Mat. Rep. Seq., Fin. Goods, Full Seq., OEE, OLE, OCU

Equipment Effectiveness: 81.22%

Labor Effectiveness: 86.00%

Performance: 90.00%

Quality: 95.00%

Rejects and Reworks: 9.00%

Capacity Utilization - Forecast: 10.72%

Planned Down Time: 0.44%

Un-Planned Down Time: 0.44%

Set Up Time: 3.39%

Capacity Utilization: 32.17%

Sl.	Order / Job	Job Qty. Del. Date	Status Shift	Work-in Progress	Rejects Reworked	Q.C	Start - Finish
1	LOW VOLTAGE CABLE JOB ID. ONE PN-ALB5-SHEETED	30,000 31/12/2009	(Shift - ALL)	Sheathing 15,000	899 720	17,101	26/11/2009 - 00:11 26/11/2009 - 14:01
2	MED VOLTAGE CABLE JOB ID. TWO PN-ALL5-SHEETED	30,000 31/12/2009	(Shift - ALL)	Sheathing 27,000	1,351 1,060	25,649	11/12/2009 - 18:58 14/12/2009 - 00:30
3	Single Core Cable Job Id. Three PN-D-RH-05-AL	10,000 31/12/2009	(Shift - ALL)	Coiling 8,999	451 356	8,540	03/12/2009 - 02:53 03/12/2009 - 16:11

Refresh Interval: 1 mts. Metrics Date Range: 23/11/2009 - 25/11/2009. Last Refresh at 21:23 Hrs.

Optiflow-Le is the first and only MES/OES solution to provide Overall Labor Effectiveness.

## Product Data Management

Optiflow-Le comes with a simple, yet powerful tool to manage product data and lifecycle.

Includes part definitions, process definitions, material definitions and material requirement.

Provides an interface to link to CAD/CAM applications.

Also provides links to handle submissions, approvals and releases.

Comes with user management functions and visibility management at the document level.



## Real-time Factory Intelligence

Apart from KPI's as mentioned above, factory intelligence includes :

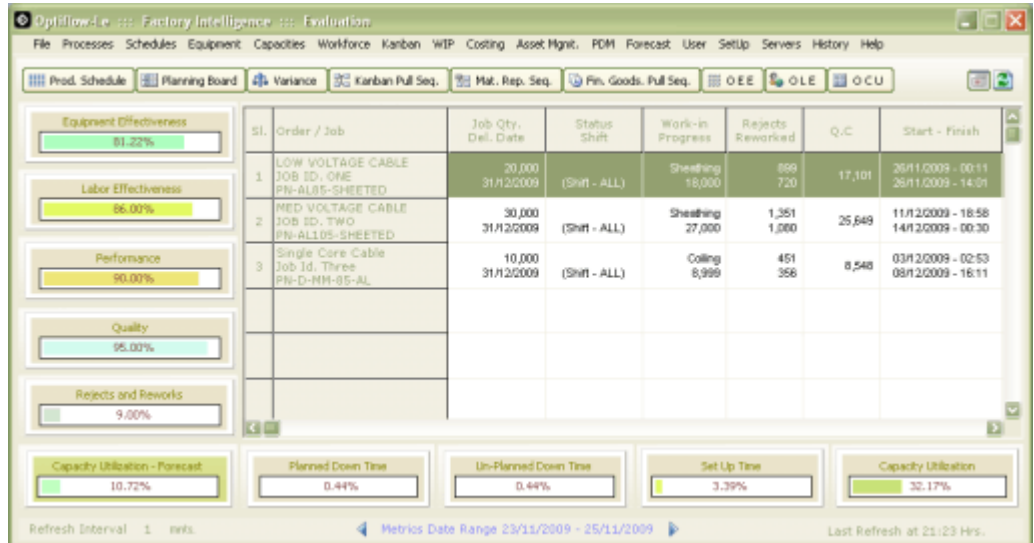
In-depth Labor performance tracking

Equipment tracking

Work-in-Progress tracking

Material & kanban tracking

Capacity utilization tracking ... and many more.



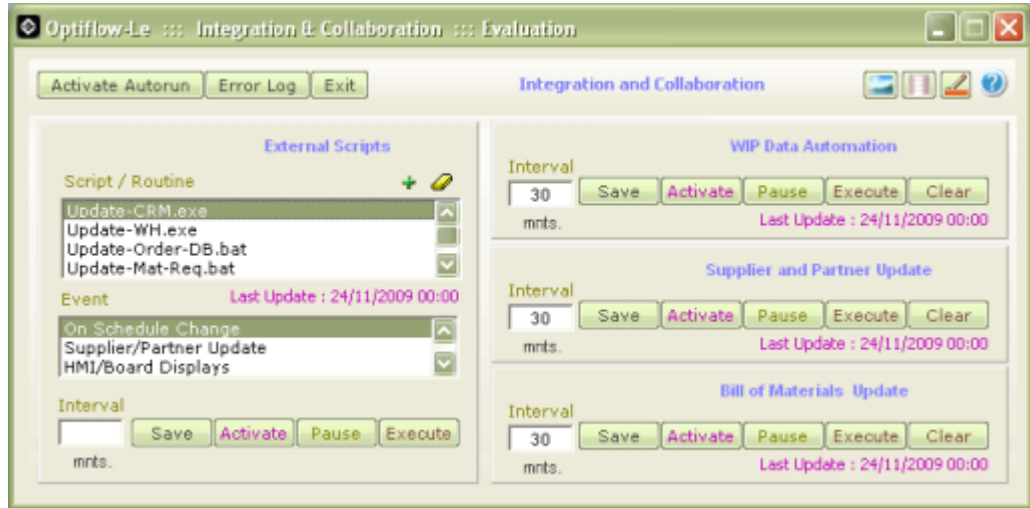
## Data Acquisition

WIP data can be manually updated through Optiflow-LeDA - a separate module.

Data acquisition through platform components such as OPC controls and SCADA can be automated.

Updates from SCM / CRM and collaborating partners can also be automated.

All you need are a few scripts added to 'external scripts'.



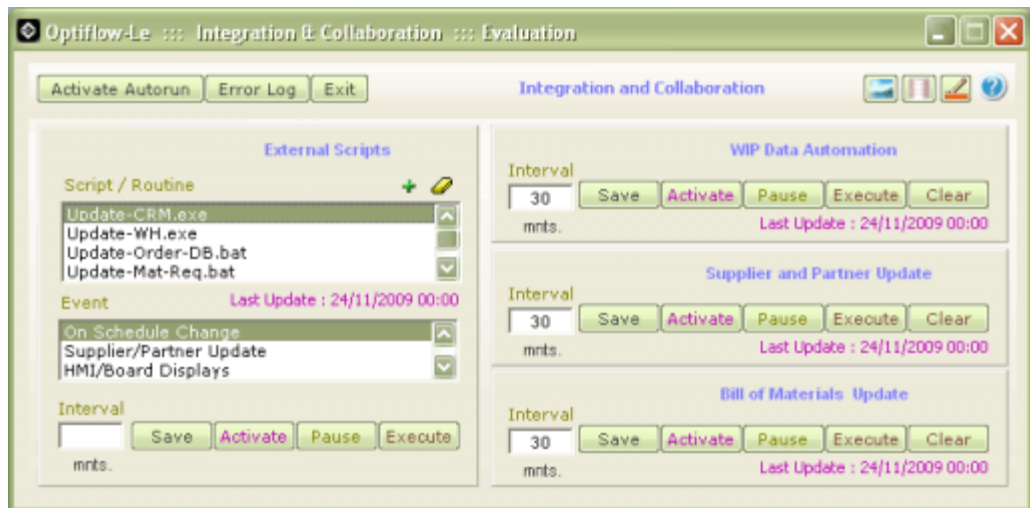
Please refer Optiflow-LeIc documentation wherein procedures are explained in detail.

## Plant-to-Enterprise Integration

Optiflow-LeIc provides the mechanism to integrate plant-floor with rest of the world.

It is as easy as adding simple routines and / or executables to 'external scripts' and providing a triggering event and a time interval.

Standards and compliances won't apply here as we have a layer in between.



Please refer Optiflow-LeIc documentation for details.