

Asprova

Industry Solution

Catalogue with case study reports and samples



Chemical Industry

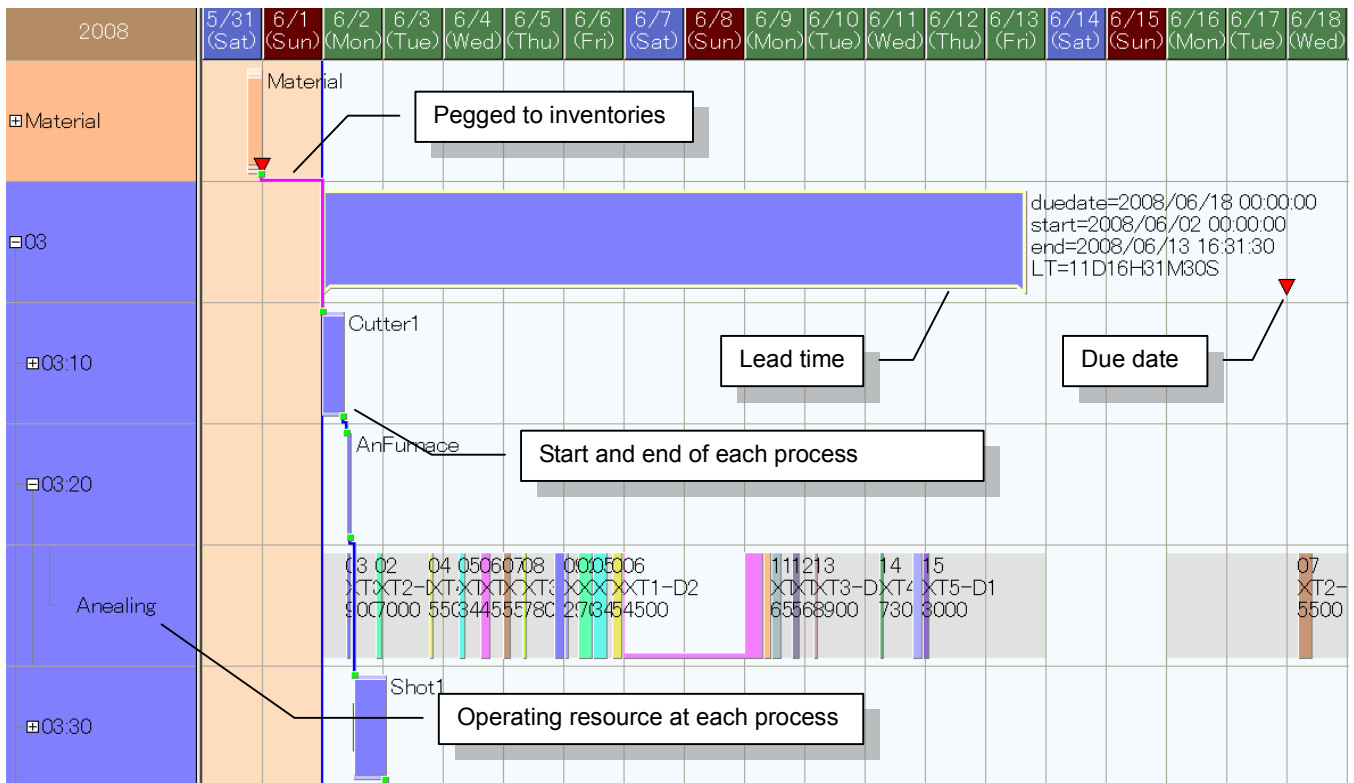
Five problems of Chemical industry

- ① Quality control ... Efficient scheduling is required, because in-progress goods have expiry dates
- ② Due dates ... As the production processes go farther from the material input phase, the in-progress goods become more diverged or complicated depending on their packing types, and factories do not know whether they can accept urgent orders and delivery date changes.
- ③ Cost and Profits ... Cost and profit per product should be visualized
- ④ Tank facilities ... Efficient allocation plans, which take care of tank facilities' complex constraints as well as cleaning maintenance, are needed
- ⑤ Globalization ... Close coordination with foreign factories is hardly maintained

Asprova's high speed production schedulers which enable "visualization" of schedules have served our clients' needs. The following is the introduction of Asprova's solution.

Finding the due date by schedulers with finite capacity

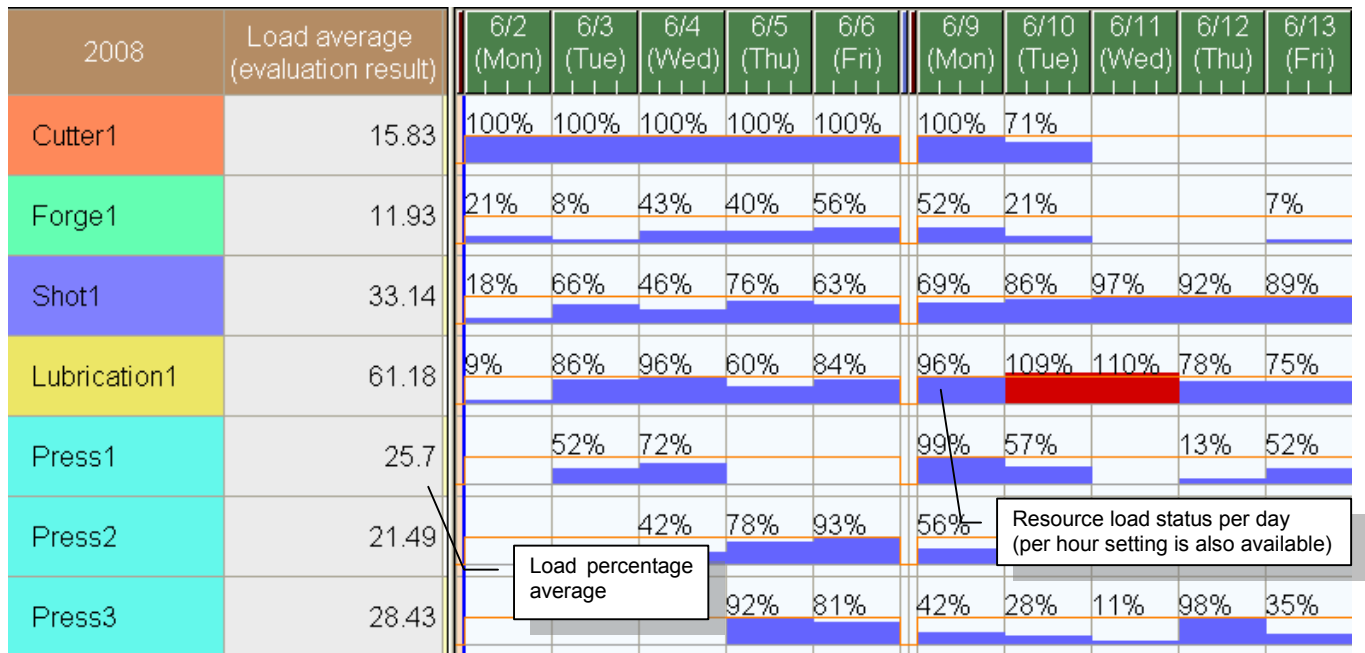
Schedulers with finite capacity make production plans which can be directly used as work instructions. Schedulers can manage urgent orders and due date changes, allocating inventories.



◆ Order Gantt Chart: enables checking of overdue orders, wait times of each process, inventory allocation. The Order Gantt Chart's standard feature includes a Resource Gantt Chart, an Instruction Gantt Chart, an item Gantt Chart, overdue flags. The Order Gantt Chart is easily operated with the mouse.

Efficient load adjustment

Asprova is capable of efficient load allocation to multiple production lines. Asprova also manages to take into account facility investment simulations and manpower employment planning. Shift changes per facility or worker are easily operated with the mouse.



◆ Load graph: current load status is recognizable in one view. Displayed periods, displayed resources, and text display are customizable at your will. In addition, inventory graphs and leading time graphs are included as a standard feature.

Skill map to manage workers capacity

The "Skill map", a table to set up process skill of employees, is provided as a standard feature. It enables managing of employees' capacity, ability/inability and processing speed, separate to integrated master tables such as the BOM(Bill of Materials) and resource capacities.

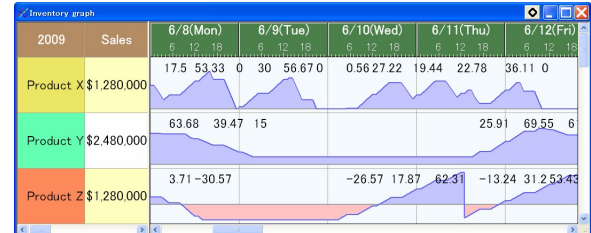
	Resource code	Resource name	Recieve	Inspect 1	Cut 1	Treat 1	Cut 2	Forge	Die	Fix 1	Join	Fix 2	Treat 2	Adjus t	Inspect 2	Deliver
1	0001489	Smith	○				○	○	○	○						
2	0001857	Johnson	○				○	○	○	○					○	
3	0001899	Williams														
4	0001945	Jones	○	○	○											○
5	0101938	Brown				○				○	○	○				
6	0101959	Davis											○	○		
7	0102848	Miller				○				○	○	○				
8	0102859	Wilson														○
9	0102933	Moore				○				○	○	○				

◆ Up to 999 skill types can be added. Displays and input means are also easily customized.

Production Scheduling pegged to inventories and order information

Registering orders not only per production lot but also per sales order lot is possible. Production schedule planning, eliminating unnecessary inventory, can be made while taking into account safety inventories.

Item	Mo	Customer	Type	Qty	Sum	1	2	3	4	5	6	7	8	9	10	11	12		
AX100	6	ABC Ltd	Company forecast	600	600	24	23	23	23	23	23	23	23	23	23	23	23	23	
			Customer forecast	720	24	23	23	20	30	30	30	30	30	30	30	30	30	30	30
			Firm orders	90	24	24	22	20											
			Production	920.4	0	20	60	0	59	40	40	49	50	40	0	40	0	40	
			Remainder	200	12	70	55	55	55	35	15	5	-4	-24	-24	-24			
7	ABC Ltd	Company forecast	600		24	23	23	23	23	23	23	23	23	23	23	23	23		

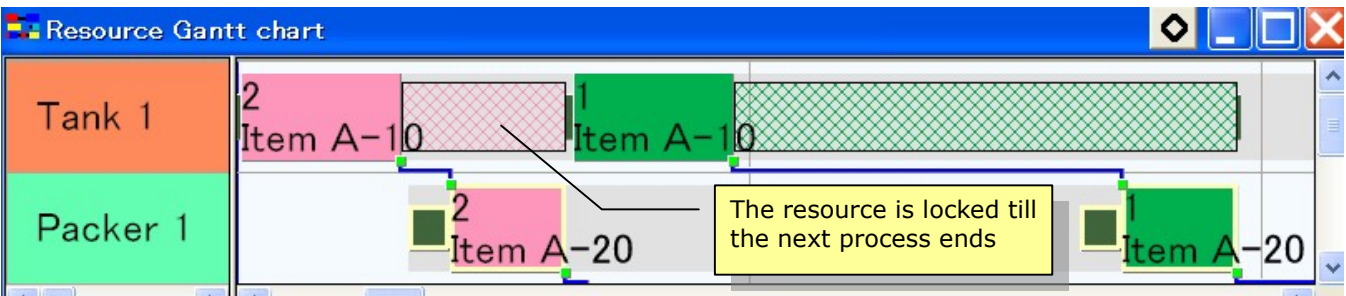


- ◆ Sales plan table: The information on orders for a certain period can be registered with the accuracy of company forecast, sales forecast, customer forecast, and confirmed orders.
- *Sales order option is required.

- ◆ Inventory graph: inventory changes and material requirement can be calculated at one view. In addition, production graphs and consumption graphs are available. Calculation functionality for each term is also included.

Scheduling which covers tank facility constraints and the expiry date

Asprova features an excellent lineup of logic options: the "resource lock time option" which covers the constraints specific to tank facilities, the "event option" which manages cleaning event scheduling, and "time constraint MAX option" which makes consumption deadline-adjusted schedules.



- ◆ Resource lock time option ... The constraint specific to tanks, in which materials cannot be input to tanks until the next process finishes because in-progress goods stay in the tanks.



- ◆ Event option: Event option generates events to occur. For example, one cleaning event is set to occur after machines are used three times in row, or one maintenance event is set to occur after machines deal with three tons of material, etc.

Evaluation of the result of scheduling and simulation by KPI

Key Performance Index ("KPI") including sales, profits, profit rates, the material cost can be calculated by cost per item and working cost per resource. Calculation formulae can be freely customized. Also, standard cost breakdown can be calculated. It can be used to verify the result of facility investment simulation as well.

* KPI option is required

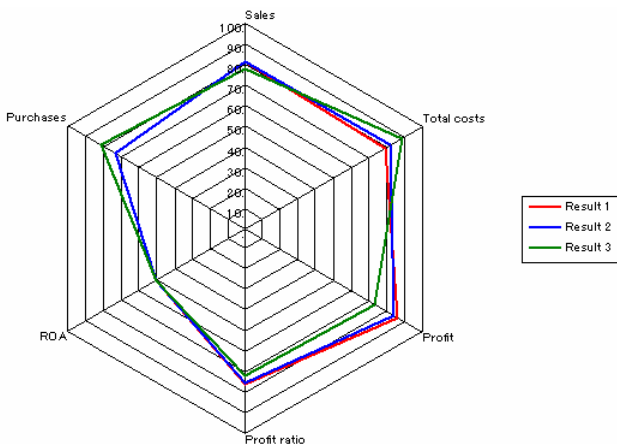
Edit KPI evaluation result

Property	Value	Description
Evaluate KPI(09/12/24)	Evaluate KPI	
- Earnings	\$16300000	Total monetary value of sales orders with
- Material cost	\$7400000	Total monetary value of purchase orders
- Outsourcing cost	\$1240000	Total outsourcing cost for resource durin
- Labor cost	\$3800710	Total labor cost for resource during the s
- Total cost	\$12440710	Total cost during the specified period.
- Profit	\$3859290	The profit during the specified period.
- Profit ratio	23.7%	The ratio of profit and earnings during the

KPI Common All properties /

OK Cancel

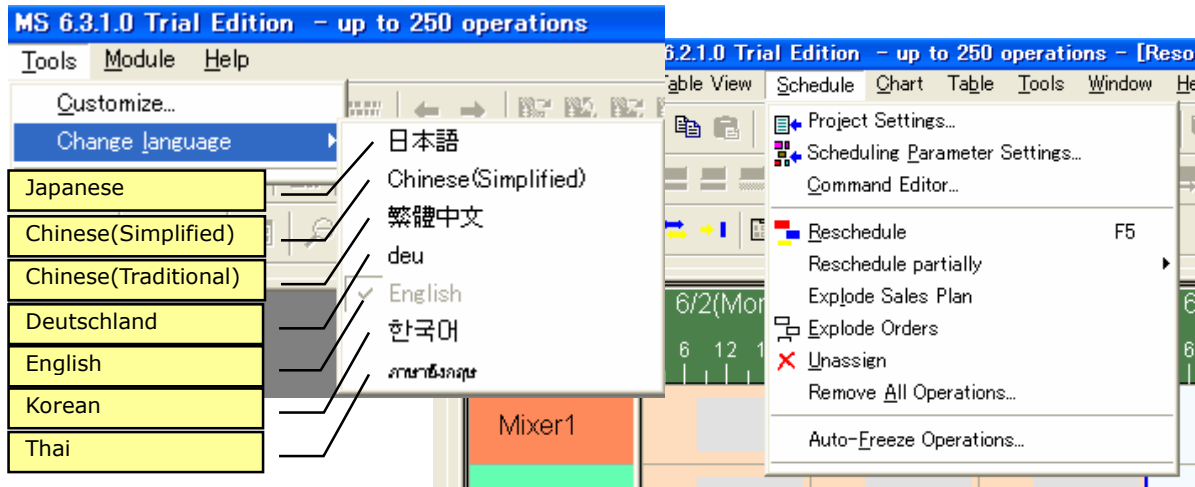
◆ KPI(Key Performance Index): KPI can evaluate the calculation result and keep records.



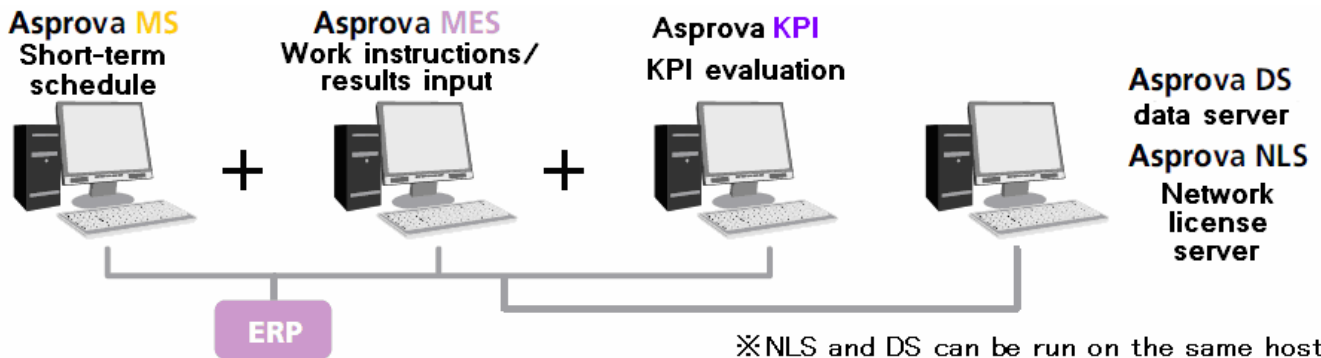
◆ KPI radar chart: KPI radar chart enables comparison of the simulation result by radar chart (with HTML View)

Adaptable to global networks

Asprova is available in Japanese, English, Chinese (Simplified Chinese and Traditional Chinese), Korean, German, Spanish, Portuguese, and Thai. Using the same package enables very close co-operation and understanding between different plants.



◆ Adaptable to Multi-languages: Displayed languages can be changed during running.



◆ Adaptable to Network: production scheduling is shared through the network.



Introduction to the case studies

To read our latest case study, please go to

<http://www.asprova.com/em/case/index.html>

Fuji Film Computer System Co., Ltd

Founded: July 1, 1998
 Capital: 490 million yen
 Annual turnover:
 Number of employees: 130
 Business description: Developing information system strategies for Fuji Film Group & establishing and managing their information system

URL: <http://ffcs.fujifilm.co.jp>



Planning period shortened by more than 20%, and reduced planning staff by 50%

Fuji Film Computer System Co., Ltd. was founded in 1998, and is an information service company engaging in IT related business affairs for Fuji Film Group, dealing with the development, establishment and management of information system strategies for the whole group.

A visit was made to Fuji Film's Kanagawa Plant - founded in October 2006 by taking over Fuji Photo Film Co., Ltd. - which manufactures products such as camera films and X-ray films. In March 2004, this plant completed the introduction of Asprova in order to promote efficiency in preparing process planning for those products. At that time, Fuji Film Computer System led the implementation.

Mr. Ozawa of the Logistics System Department, System Division, commented on the purpose of introducing Asprova, the points why it was chosen, and the actual benefits brought forth by the introduction of Asprova.

“We found it hard to draw a line between standard functions and customization”

In regard to the introduction of Asprova, Fuji Film Computer System has independently promoted the establishment of its system without depending on system development companies for help. There were reasons why this company played the main role in advancing this project. Around that time, the environmental changes that surrounded the Group had just become severe. Consolidations of departments and divisions were underway, as well as the relocation of machinery.



Tatsuya Ozawa
 Logistic System Department,
 System Division

“In order to cope with rapidly changing business environments around that time, the manufacturing process for camera films required an improvement in efficiency in preparing plans. Given these circumstances, we considered utilizing Asprova as it was not only already in place for our other products but also didn't require a high introduction cost.”

Introducing Asprova, Aiming at Efficiency in Planning

The manufacturing processes for camera films, to which Asprova is applied, are divided into the following 4 main processes: First, the roll-shaped films that were already manufactured at a different manufacturing process are cut into the designated width (i.e., size for usage). Next, the punching treatment (i.e., the making holes) is conducted, to allow the film to be set on the camera itself. Third, the treatment which winds film to the core (i.e., spool). Last, the exterior wrapping treatment prior to shipment, in which films are put into either plastic cases or exterior boxes.



There are 6 manufacturing processes, if the detailed manufacturing processes are included. In this state, the number of work applications amounts to 600 to 700 on a monthly basis. So the number of work instructions amounts to about 4,000 monthly. The number of manufacturing BOMs amounts to 5,000 - 6,000. In addition, it is common to undertake speculative production for domestic products, while products for export are normally manufactured after receiving orders. Prior to the introduction of Asprova, the system of the host computer dealt with the preparation of planning for this processing manufacturing process. Previously, a one month operational plan used to be set up for each machine as well as for each manufacturing process. Around that time, it took about 4.5 days to prepare such planning. On those occasions, re-scheduling required a lot of troublesome labor and time when changing the plan a little bit.

To solve such problems as well as realize the promotion of efficiency in preparing planning, Fuji Film Computer System Co. Ltd. proposed the establishment of a system at its Kanagawa Plant which would make it possible to easily prepare planning through the utilization of a GUI (Graphical User Interface). It insisted on the utilization of a readily available packaged product without spending excessive extra time, or cost.

As a result, Asprova was chosen. Mr. Ozawa of the Logistic System Department, System Division, comments on why it was selected. “Prior to its introduction, Asprova was actually put in place for the preparations of the production plans. In fact, this was applied to several products that were being manufactured at our plant. Although the product was different, it had similar manufacturing processes. We realized that Asprova could be applied to the manufacturing processes for camera films. Also, it didn't require much cost for its introduction. This was a great benefit.”

Asprova APS

Points highly rated by Fuji Film Computer Systems :

- promotion of visualization
- keeping delivery dates
- reducing inventory
- improving operational ratio
- reducing lead-time
- improving throughput
- reducing planning cycle
- handling frequent planning changes
- sharing know-how

In addition, a new machine which enabled the combination of several manufacturing processes came into being. Given these circumstances, it would have required more time and money to outsource the information system. Recalling that point in time, Mr. Ozawa commented.

"We depended on our in-house technology 100% in order to complete the introduction of Asprova. However, it was very difficult to proceed with this project manpower-wise. The reason was that we had to learn about Asprova and comprehend the on-site production constraints and applicable structures at the same time. Nonetheless, we felt that Asprova was an easy tool to deal with because its system was logically built up. Also, it was easy to understand the flow where the data is first input, and then goes through the treatment process, and is finally output."

In short, the flow of the system completed through the introduction of Asprova works in the following manner: 1) The "product demand and supply system" accepts both receiving order data and prospective data, 2) It allocates the inventory for the sales forecast of the products in question, 3) It conveys to Asprova the required quantities for the actual production, 4) based on which Asprova sets up the scheduled planning.

On the other hand, as the work to be handled on the user side, the add-on system deals with treatments that change the already applied quantitative data or make decisions on whether wrapping materials are to be manufactured at the in-house plant or outsourced based on the availability of the budget. "This is where we struggled to divide our requirements into those which could be handled by Asprova's standard features, and those which required customization using the add-on system", says Mr. Ozawa.

In addition, the company independently developed the master registry system by itself. This was prepared so as to minimize user labor as much as possible in case of the occurrence of any environmental changes.

Winning the understanding of shop floor management

In the process of introducing this Project, Mr. Ozawa also stated that they had paid close attention to acquiring the consensus from the shop floor.

"Some people tend to show feelings of rejection against any changes that are to take place along with the introduction of a new system. Given this situation, I frequently made personal visits to the shop floor and tried to establish good relationships while promoting the prospective benefits that could be brought forth to our whole company. In doing so, I won the people's understanding toward the introduction of Asprova," says Mr. Ozawa.

In the past, for example, the films had been manufactured in 1,000 lot units. However, Asprova assigns the resources abilities in units of "time." It will be thus inevitable to generate fractions in terms of the "numbers" of which the films are to be produced. The manager of the shop floor showed his reluctance for this kind of change. However, it was realistically possible to cope with this kind of situation.

"In this regard, I emphasized the following benefits in order to persuade him. The faster the scheduled plan was made, the faster it became to order wrapping materials from wrapping materials manufacturers. This would then enable the realization of our smooth deliveries. In addition, it would also shorten time in replying to our Sales Department on delivery dates. Furthermore, it would speed up the process in making distribution planning on whether products are to be shipped for export or warehoused in Japan," says Mr. Ozawa.

Actually, the introduction of Asprova has brought forth the 2 main benefits as follows:

First, it was made possible to realize the reduction in time for preparing plans, which had required much time in the past, by more than 20%.

Second, there were several people assigned to preparing plans at each department and each manufacturing process. However, the number of such people was reduced to less than half. In addition, those planners used to store the "implicit knowledge" such as the number of films that retained between respective manufacturing process, in their heads. However, such knowledge were made available as much as possible for the use of Asprova planning parameters, and were then taken over to the new planners in charge. In so doing, it was possible to realize the consolidation of this valuable human know-how into system resources.

Now, 20-30% of the manufacturing process for processing photo films is now automated through the introduction of Asprova. In this respect, Mr. Ozawa concluded his summary as follows:

"This time, the main purpose of introducing Asprova was to promote the automation of and improve the efficiency in preparing plans. This has resulted in shortening the time for the plans preparatory work and reducing the number of such planners. These 2 points have been achieved successfully. So we highly rate the project undertaken this time. In the future, we will be considering further improvements in efficiency in this field by expanding the scope of automated planning preparatory work."

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<http://www.asprova.jp/>

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Nippon Shikizai, Inc

Established: March 1, 1957

Head office address: 5-3-13 Mita, Minato-ku, Tokyo

Capital: 552,7million (as of February, 2008)

Annual sales: 6,08billion (2007 fiscal year)

Number of employees: 235 including 176 temporary employees

Business areas: Makeup, cosmetic and other basic skin care, quasi-drug product planning, contracting services from development to manufacturing

URL: <http://www.shikizai.com/japanese/index.html>



The installation of Asprova led to the realization of both material requirements planning “MRP” and production scheduling, in order to achieve visualization of the workflow and a reduction in the time taken to plan the schedule.

Nippon Shikizai Inc. was established in 1957 as a contract manufacturer of cosmetic products. The Zama factory, at which Asprova was installed, was set up in November 1979 as Nippon Shikizai’s main factory under the Good Manufacturing Practice, a government standard for production and quality control of pharmaceutical products. The products that Nippon Shikizai produces can be categorized into three types: powders, lip sticks, and creams. The product planning, research and development, raw procurement, manufacturing, and shipping of these products are carried out under a strict checking system.

This factory installed Asprova and was able to simultaneously execute material requirements planning and production scheduling, expanding its use to cover the Ayase and Suita factories as well. We heard from Mr. Masao Takeda, Executive Director of Zama factory and Operations, and Mr. Masayuki Hosokawa and Mr. Arihira Okubo, both in the production control team of the production operation department, who provided us with some insight into the background, the difficulty, and the impact of installing Asprova.

We aimed for to merge our MRP and scheduling systems at the same time that we replaced our ERP system.

Before installing Asprova, the Zama factory had used an ERP package as its core system and had previously tried to make use of both its MRP and production scheduling functionality. However, it took too long to carry out all the processes and so in practice the system was unusable. Mr. Masao Takeda, Executive director of Zama factory and Operations reflects on the situation back in those days. “The functionality of the ERP package used before was not acceptable in practice because we needed to spend too much time for production planning and material requirements planning. As a result of those problems, we had to do scheduling work manually with Excel, develop our own system to make material requirements planning, and input each result directly into the core system. Under this situation we had a strong desire to accelerate the processing speed as well as to reduce the workload of the staff. Furthermore, it was inconvenient that we were unable to connect the functionality of the scheduling and the MRP. So, we came up with a plan to synchronize the scheduling and MRP and aimed to build a system that would enable us to do Just-In-Time like planning and to calculate the exact material requirements so that we could reduce our inventories.”

To achieve this goal, Zama factory decided to replace its old ERP system which included a production control package and install Asprova. For reference, this factory employs a

make-to-order production system that has two major production processes, “the bulk production process” in which the contents of foundations and lipsticks etc are produced and “the assembly process” in which these contents are then put into containers and packed to become the finished product.

Nippon Shikizai chose Asprova because of its large user base and excellent functionality.

Replacing the old ERP system, then installing a scheduler and a MRP was the actual aim of the project. The Zama factory got proposals from three firms, including Japan Information Processing Service Co., Ltd., which later became its System Integration partner. Although in the beginning three different companies proposed three alternative schedulers, from February 2006 the Zama factory had started to consider Asprova and eventually, this became their chosen scheduler. Mr. Takeda explains the reason for this decision as follows: “in addition to the great installation record, Asprova’s functionality and fast processing speed made us decide to choose it. Asprova was also able to handle both process types of our production, bulk processing and assembly.” The Zama factory therefore decided to employ “JIPROS”, the ERP package provided by Japan Information Processing Services Co. Ltd., for small and medium-sized enterprises, as its core system, and initiated the preparation for Asprova installation in October 2006.



MASAO-TAKEDA
GENERAL MANAGER ZAMA FACTORY,
GENERAL MANAGER CONTROL OF MANUFACTURING DEPT.



MASAYUKI-HOSOKAWA
Control of manufacturing Sec.



AZUSA-FUKUMORI
Control of manufacturing Sec.



YUHEI-OKUBO
Control of manufacturing Sec.

This project was a very tough one because the installation of Asprova was accompanied with the replacement of the core system. The project's difficulty level was quite high due to the extent that Asprova was to set up to be able to simultaneously execute material requirements planning and production scheduling. However, the tremendous efforts which project team members made enabled them to establish an ideal structure at the present stage.

■ Points on which Asprova was highly praised

- Reduction of manual workload
- Improvement in efficiency and precision of scheduling
- Realization of MRP functionality
- Reduction of MRP error

The focus of the installation was how to set up the master for well-balanced MRP and scheduling.

The installation in the Zama factory, was quite challenging because we tried to make Asprova function as both MRP and scheduler at the same time. In this regard Mr. Masayuki Hosokawa in the production control team of the production operation department told us as follows. "Without precise scheduling there can't be precise MRP. To make both functionality work together, we would want to have all the features in one system."

When using Asprova to calculate MRP, we normally input somewhat brief dates to the master of Asprova and use Asprova as a MRP engine to run the system. In this case Asprova is a MRP rather than a scheduler. By contrast, when using Asprova to do accurate scheduling, we input detailed dates of each production process. Thus, the master of Asprova must be finely tuned in order for Asprova's functionalities of both scheduler and MRP to work simultaneously.

When setting up the master, the Zama factory has to consider the amount of material lost from sticking to the inside wall of the machine in the bulk producing processing in the factory. The amount lost differs from each machine and the differences have to be considered upon planning material requirements. Mr. Hosokawa said, "a master set up with detailed dates was unnecessary only to calculate a medium-term material requirements. We, however, must have exact numbers including the loss of bulk taken into account for material requirements planning, therefore needed a master for detail-oriented dates." Mr. Hosokawa was able to make use of Asprova's 'expressions', a standard feature to define detailed formulas, to enable to obtain the precise material requirements at the targeted level. The process was said to be the repetition of trial and error because the Zama factory needed to improve the accuracy of requirements planning result with the amount of bulk lost in each machine calculated and to have an even more detailed master for production instruction orders.

After overcoming these challenges, Asprova would finally be tuned for practical operation.

Visualization of workflow and a full reschedule in only 6 minutes.

Under the old system each section such as production management team, the bulk production team, and the assembly team, obtained dates from the core system, made each material requirement plan, and exchanged information. Thus, it took so much time and labor to fix the schedule and to figure out the final material requirements. The installation of Asprova made a big change of this situation. Mr. Hosokawa said that "the flow is as follows; order data and inventory data are delivered from the core system to Asprova MS,

the production management team reschedules and obtains MRP, then the detailed schedule is going to be made and delivered to each team. The sections concerned check the schedule on Asprova MES. Having Asprova make MRP and registering the calculation formula into the master, we can visualize the flow"

Currently Asprova receives each dates from the core system twice a day and makes three month-plans of all the orders. It takes only six minutes to make schedules even though they multiply assign a plan to obtain precise MRP and production schedules with the exact amount of bulk lost. With this regard, Ms Azusa Fukumori in production management team said that "Because we produce our products upon receiving orders, our production plan is to be often re-planned as our customers change their requests. Every time we reschedule our plans, Asprova needs only 6 minutes to reschedule and we rarely feel stress. To establish our schedule, we repeatedly reschedule with variable factors."

The Zama factory created an operating procedure document for the core system and Asprova when installing those systems. Mr. Arihira Okubo in the production management team told us on this point that "I, myself, went through difficulties not knowing how to operate the old core system. So, I drafted an operating procedure document, hearing and researching the workflow from the persons in charge of each process and making photocopies of many detailed operating screens of the core system as well as Asprova so that anyone anytime could use the system as people change."

This operating procedure document becomes "the manual" consisting of over 220 pages. This effort shows well that the Zama factory pays attention not to centralize know-how to some specific persons. After starting the system operation, the Zama factory made effort to successfully shorten the formula for MRP from over 8,000 to some hundreds characters, making use of Asprova's COM interface to create a plug-in, to make it easier to maintain the calculation formula in the future.

The Zama factory made plug-ins to simplify the operation which adjust schedules and realized the reduction of workload and improved manageability. In addition, the factory exercises its ingenuity, for example, to build up a tool with Access to enhance operating efficiency because it is important for the Zama factory to keep up with the master all the time due to the continual replacement of around 40 percent of all products and a high speed product cycle. In this way, the factory solved major problems in operation upon and after installing Asprova. Mr. Takeda said that "the aimed-for system has been built so far in this project. As long as the company's direction and operating method has not changed, we will keep using the current system with some additional improvement as needed. Although we haven't succeeded in reducing inventory because of various external factors, once the situation around us gets settled, the figures will indicate its efficiency."

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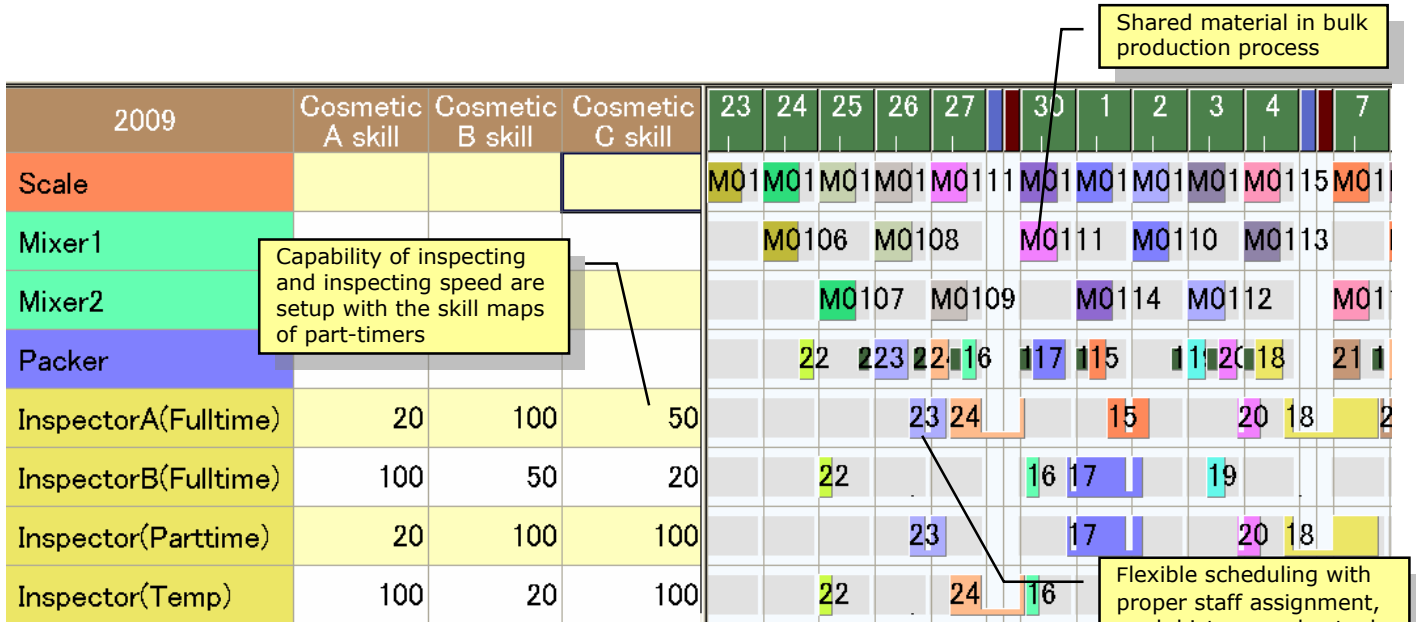
Introduction to the sample data

The sample data, the case studies of our clients who installed Asprova, is introduced here. If Industry sample data is needed, please sign up at the membership registration page of our website or at

http://www.asprova.com/en/asprova/document_library.html

Cosmetic and Pharmaceutical(mixing/packing)

Asprova MS + Options not in use

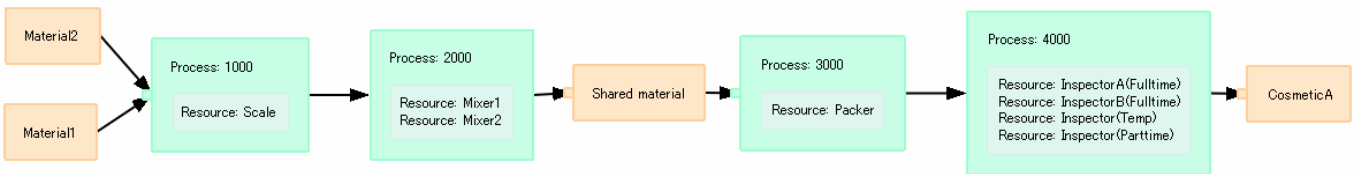


Capability of inspecting and inspecting speed are setup with the skill maps of part-timers

Shared material in bulk production process

Flexible scheduling with proper staff assignment, work history, and actual performance reflected

Process Flow



Item setup in packing process (Item setup table)

	Resource	Item L	Item R	Setup time	Sort order
1	*	CosmeticA-30	CosmeticB-30	130M	2
2	*	CosmeticB-30	CosmeticC-30	130M	2
3	*	CosmeticB-30	CosmeticA-30	240M	2
4	*	CosmeticA-30	CosmeticC-30	180M	2
5	*	CosmeticC-30	CosmeticA-30	130M	2
6	*	CosmeticC-30	CosmeticB-30	240M	2
7	*	*	*	0S	1

Integrated Master Editor with workers skill setup

Item	Process number	Instruction code	Resource/Item	Resource valid condition	Production
CosmeticA	30	In0	Shared material		
		M	Packer		300ph
	40	In0	CosmeticA-30		
		M	InspectorA(Fulltime)	ME.Skill1>=50	300ph/(OTHER.Skill1/100)
		M	InspectorB(Fulltime)	ME.Skill1>=50	300ph/(OTHER.Skill1/100)
		S1	Inspector(Temp)	ME.Skill1>=50	0
		S1	Inspector(Parttime)	ME.Skill1>=50	0
Shared material	10	In0	Material 1		100
		In1	Material2		200
	20	M	Scale		300ph
		In0	CosmeticA-10		
		M	Mixer1		300ph
		M	Mixer2		300ph

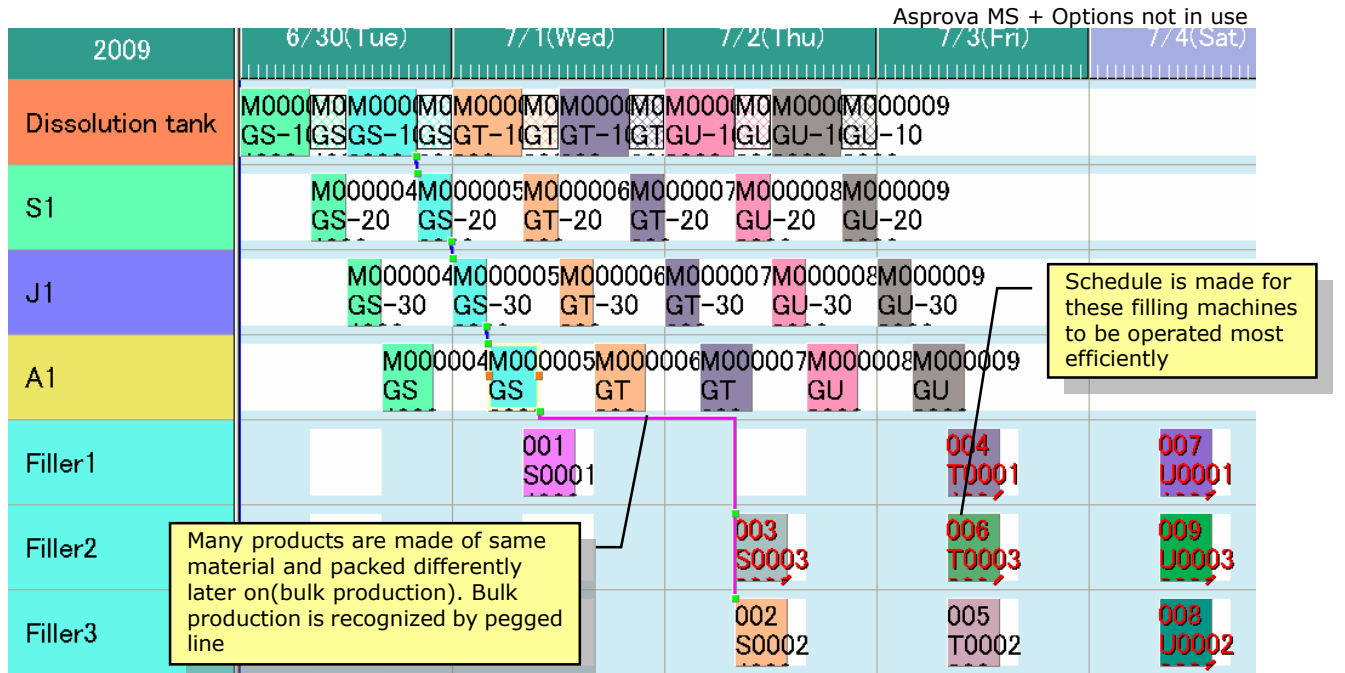
Master data is setup based on each employee's capacity. Computation expression need only be set up the first time. It is adjusted by skill map (resource table) during operation

Shared material in bulk production(Item table)

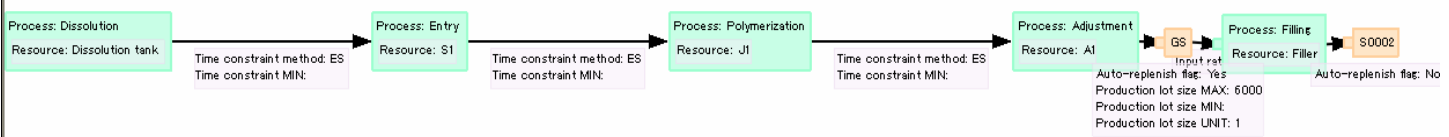
Item code	Auto-replenish flag	Production lot size MAX	Production lot size MIN
15 Shared material	Yes	2000	1000

Data

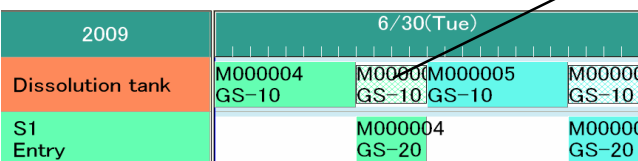
Adhesives(dissolving/polymerizing/packing)



Process Flow



Resource lock time in dissolution tanks (Resource Gantt Chart)



Semi-processed products stay in the dissolving tank till they proceed to the next process. Resource (tank) is locked so that next dissolving operation is not going to get started till the bulk in the tank is moved out

Auto-replenish setting of in-progress products (Item Table)

	Item code	Auto-replenish flag	Production lot size MAX
1	⊕ GT	Yes	600
2	⊕ GU	Yes	3000
3	⊕ GS	Yes	6000

Scheduling parameter to setup load leveling of resources

Property	Value	Description
<input type="checkbox"/> Default resource evaluation	Default resource evaluation	
<input type="checkbox"/> Target resources (0)		Resources that use this evaluation expression. If empty, all resources are included.
<input type="checkbox"/> Additional evaluation expression (0)		Adds a custom evaluation weighting.
- Resource load calculation start time		Start time of the period in which the resource load is calculated.
- Resource load calculation end time		End time of the period in which the resource load is calculated.
- Weight - load leveling	1	Calculates the average of the ratios of total required resource to total available resource.
- Weight - setup time minimization	1	The longer the setup time that would occur between the operations, the higher the evaluation score.
- Weight - resource priority		The higher the priority, the higher the evaluation score.
- Weight - outsource minimization		If the resource type is Outsource, the evaluation score is increased.
- Weight - wait time minimization	1	The longer the wait time, the closer the evaluation score to 1.
- Weight - lateness minimization	1	If the end time of the current operation is earlier than the target end time, the evaluation score is increased.
- Weight - production time minimization	1	The longer the production time, the closer the evaluation score to 1.
- Weight - juxtaposing operations of same order		If an operation is assigned to the resource, the more the operations of the same order are assigned, the higher the evaluation score.
- Weight - juxtaposing operations of same item		If when the operation is assigned to this resource the operations of the same item are assigned, the higher the evaluation score.
- Weight - juxtaposing operations of successive processes		If when the operation is assigned to this resource the operations of successive processes are assigned, the higher the evaluation score.
- Weight - next resource constraints		In forward assignment, the evaluation score is 1 if the resource is not constrained by the next resource.

Data

Mining(Cokes oven)

Asprova MS + Resource lock time option

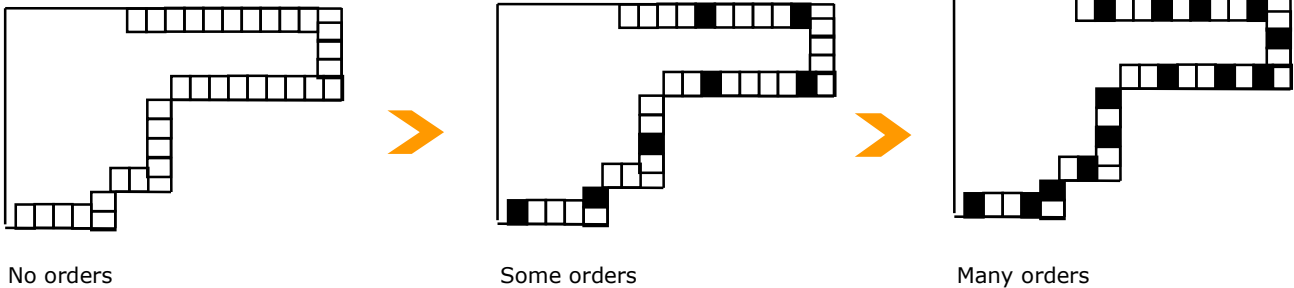
Problem and solutions

① [Scheduling problems of coke ovens]

One heating unit of cokes oven consists of a coke chamber where coal is input and carbonized, fuel rooms which burn fuels to heat the coke chamber from both sides, regenerative furnaces which collect and burn emission gases to preheat air. Normally, several dozen or several hundreds of heating units form one furnace group.

When there are not many orders and only some chambers are used, the imbalance of temperature occurs inside the cokes oven, deteriorating the quality. To avoid such deterioration, even intervals must be kept between operated chambers.

The below pictures are cokes ovens viewed from above. There are multiple chambers allocated, and using adjacent chambers, beyond necessity, is avoided.



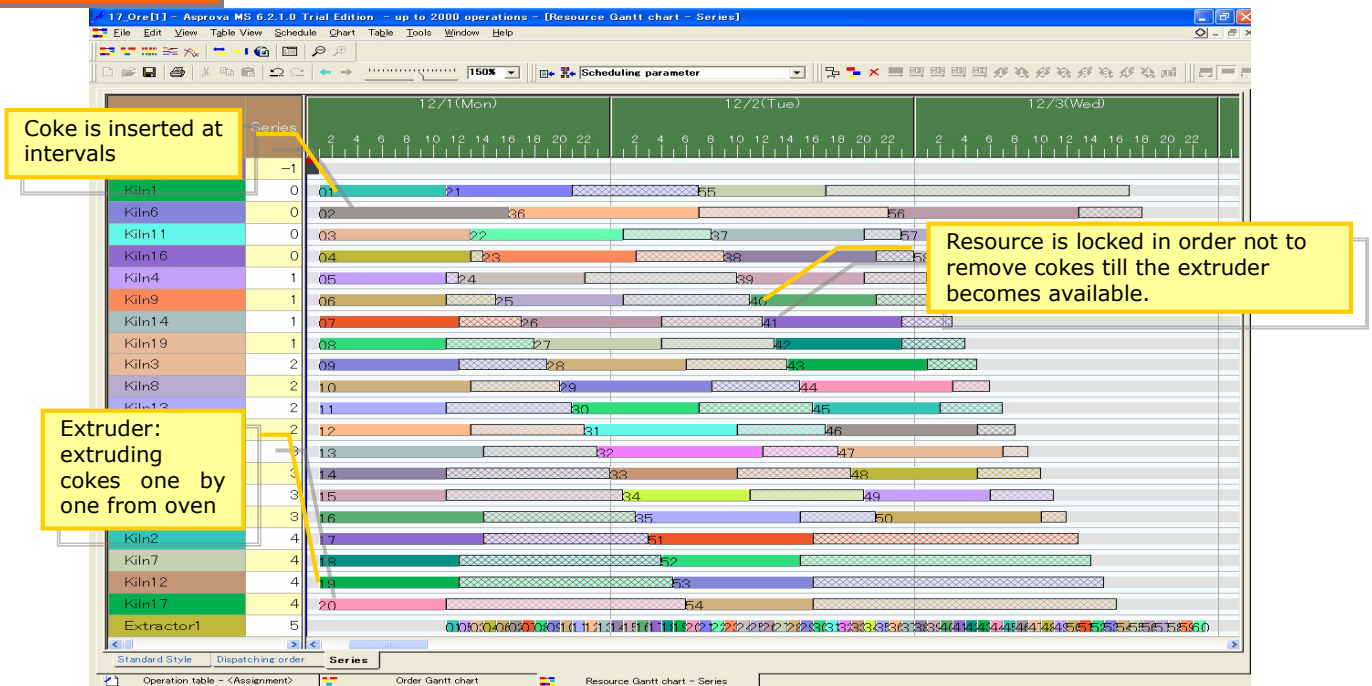
⇒ Scheduling parameter setting realizes the above constraints with the standard features.

② [Scheduling problems of coke ovens]

Upon finishing heating, coke is extruded out of the chamber. Extruding machine extrudes cokes one by one. Consequently, if extruding machines are not operating, coke may not be able to come out of the chambers even after heating operation is done. Also next orders cannot get started.

=>Resource lock time option is used

Process Flow



Data

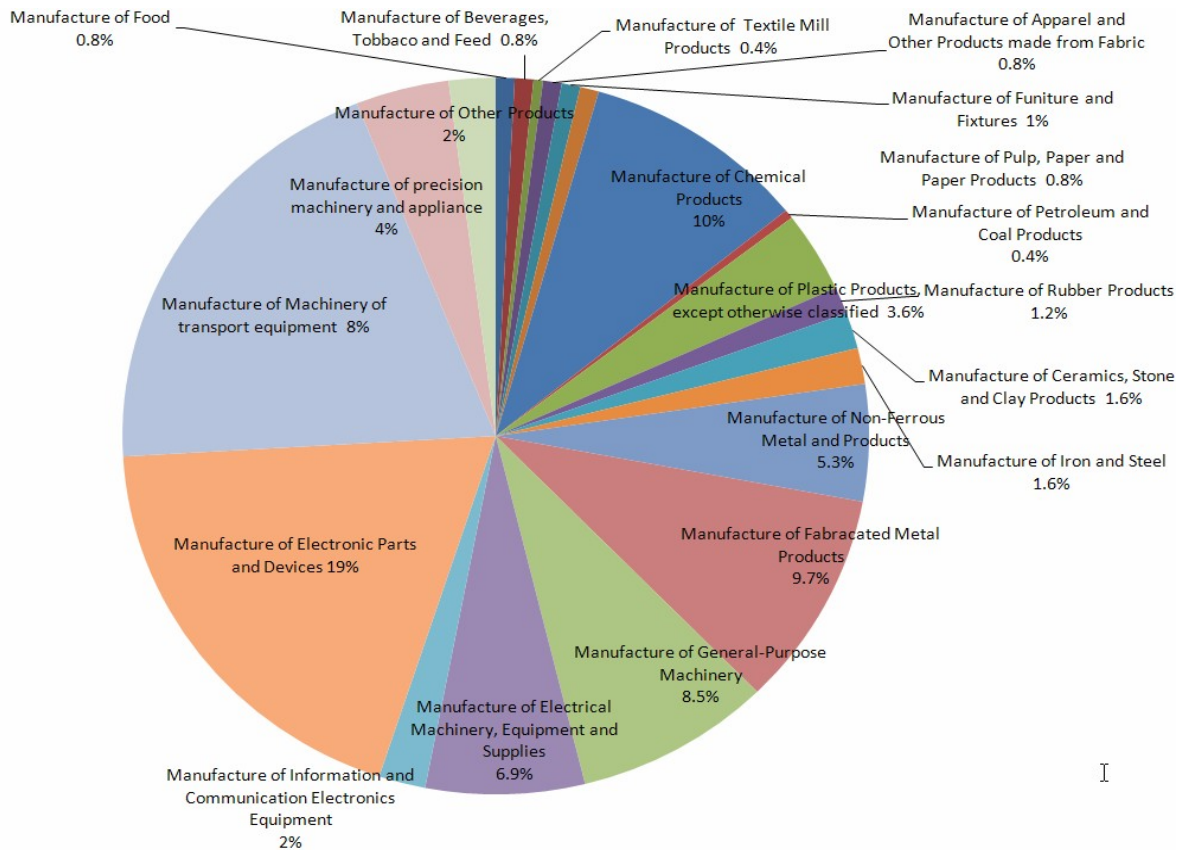
Key points of process Manufacturing

- 1 Manufacturing starts in the bulk production process and branches into more than one process to produce multiple products in most cases
- 2 In-process goods have little time to be left unprocessed. (They must be put in the next process immediately)
- 3 Tank resources tend to become constraining factors: "tanks are not available until the next process gets done", "tanks can deal with only certain items together", "Items wait for the orders coming in the tanks", and "Cleaning the tanks"
- 4 Dealing with discrete unit goods: efficiency is needed.
- 5 Dealing with bulk units, such as kilogram, meter, and liter

Related features

Auto-replenish production, Time period grouping, Time constraint MAX option, Resource lock time option, Event option, Safety stock, Inventory constraints, Assigning workers, Skill map, Furnace resource, Inventory graphs, Load graphs, Production/purchase plans, Sequence control option, Evaluate schedule, Operation split

The fields of Asprova users



Electric Electronics	LEDs, connectors, solderless terminals, microprocessors, printed circuit boards, silicon wafers, air conditioner cases (plastic molding), speakers, ceramics, watches, semiconductors, lead frames, CD-ROMs, CD-R / DVD / CD-ROM drives, electric wire, LCDs, stereos, photo masks, WF cables, sockets, mobile phones, connectors for mobile-phones, IC packages, aluminum electrolytic capacitors, photoresist, TFT modules, piston rings, needles, piano wire, printer pins, automotive meters, photoelectric board, digital cameras, car navigation systems, refrigerators, light fixtures, sensors, signal controllers, solar-powered battery modules, vacuum fluorescent displays, batteries, multipolar connectors, power cables, mainframe computers, projection equipment, quartz transmission equipment, desktop PCs, carbon electrodes, projectors, printers, power boards, heating equipment controllers, solar cell wafers, medical electrical equipment, SD cards, portal media players, connectors, bar code readers...
Automotive	Engine parts, doors, chassis, interior (plastic molding), metal molds, shock absorbers, vehicle inspections, pipes, tubes, engines, cranes, rubber, aircraft parts, test bodies, brake parts, high-pressure hose, seat fabrics, wire rope, transmissions, camshafts, crankshafts, cases, wire harnesses, motorcycles, bicycles, railway carriages, external parts for ships, anti-vibration equipment for vehicles, tires, movable cranes...
Machinery	Looms, kitchen appliances, machine tools, agricultural machinery, industrial machinery, optical instruments, light fixtures, air conditioners, heating appliances, plastic parts for office equipment, control computers, material handling equipment, power transmission equipment, power-driven hand tools, internal combustion engines, in-line instrumentation systems, wafer visual inspection equipment, centrifuges, sewing machines, heat treatment equipment, tanks, water tanks, turbines, condensers, model engines, vacuum pumps, wafer precision equipment, food products machinery, electric facilities, gas and water-related tools, water supply-related instruments, electric welders, stage lighting fixtures, sewing machine parts, pumps, ultrasonic diagnosis equipment, CNC, robot transfer machines, nuclear equipment, crystal units, rubber hose. Fire alarm equipment...
Metal	Drills, screws, cannons, wire, plumbing fixtures, guard rails, pipes, magnet wire, steel, sheet metal parts, fences, metal bridge parts, blades, connecting rods, nuts, industrial precious metal products, drawing alloys, aluminum for beverage cans, blades for cutting machines, gears, metal springs, timer parts, precision gears, aluminum foil, sheet copper, ship plates, drawn copper products, specialty steel products, cutting tool tips, lubricating oil packaging, beverage cans, magnets, seamless pipes, large scale pumps, process pump, coupling, clad steel sheet, transmission gear...
Non-metal	Corks, packaging, textiles, paper, shipping blocks, camera films, rubber products, ABS resin, synthetic resin, UV ink, gravure ink, printing of packing materials, coated abrasives, resin hose, coating materials, dental materials, film sheets, ceramic base for electronic parts, tiles, firebricks, new ceramics, catalysts, paper clay, fasteners, glass for LCD displays, adhesives, packing tape, stencil paper for wigs, sensitized resin, natural resin, cosmetics materials, inorganic pigments, lenses for microscopes, nonwoven fabric, aluminum foil, man-made leather, aluminum cans, resin mold, silicon wafer...
Consumer goods	Fermented soybeans, detergent, flour, plastic bags, plastic food containers, plastic models, office goods, fishing reels, microwave dinners, wood processing, socks, cans, cosmetics, rubber stamps, ballpoint pens, shampoo, shopping bags, cardboard, home exterior products, drinking water, entranceways, underfloor storage units, fixture components, shoes, toy parts, necklaces, stockings, office furniture & fixtures, coffee beans. Labels, envelopes, stationery, candy, gummy, seasoning, steel furniture, toner cartridge, curtains, food trays...
Medical	Medical products, test drugs, medical equipment, laboratory testing reagents, granulated powder, pills, endoscope, dental materials, clinical test medicine, chemicals...
Chemical	Adhesives, plastic, asphalt, silicon, motor oil, polyethylene, polypropylene, molding materials, rubber, fluorine chemical products, polyvinyl chloride, polyvinyl chloride paste, plastic paint products, make up products, chemical substances...

System requirements

Item	Requirement
Memory	At least 1GB
Hard Disk space	At least 300MB hard disk space
CPU	Faster than 1GHz(If 64bit, it's compatible to x64)
OS	Windows Server 2003 Windows 2000 Server Windows Vista Windows XP Professional Windows 2000
Other	If using 64bit-CPU, compatible to x64

※The requirement of Memory, hard disk space, and CPU depends on its usage and the amount of data dealt with.



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※Product specs are sometimes changed upon version-ups.
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