for Manufacturing
Struggling Industry with Time

Production scheduler of the next generation with ultimate flexibility

FLEXSCHE

6th Edition

https://www.flexsche.com/en

INDEX

Just using FLEXSCHE
does not realize ideal factory operations.
However, with FLEXSCHE
and a passion to aim for greater heights,
we can take a big step towards the ideal.

To bring out the full potential of the factory and respond to the daily needs is a continuous fight against time.

While the environment surrounding the manufacturing industry undergoes major changes,

it is inherently difficult to continue traditional production activities

based on rule of thumb planning and static information geared towards "the present".

A tool for directly solving such troubles of manufacturing sites, that is the production scheduler FLEXSCHE /ˈflɛkʃɛ/

FLEXSCHE Corporation has been exclusively developing production schedulers since being founded in 2001.

The circumstances surrounding the manufacturing industry have undergone tremendous change in recent years including a shift to production of many products in small lots, the demand for quick responses to due time requests and frequent changes in production planning. This has made it increasingly important to run factory operations in a fine-tuned manner than ever before. Production schedulers are widely recognized for their value as indispensable systems in realizing these requirements, and the demand for schedulers has become great. In line with this, many software packages have been developed.
Of course, grouped as the "manufacturing industry" makes it seem simple but the industry itself is quite broad and diverse in scope and the functions demanded of a production scheduler differ by industry type, factory and process. Companies must carefully consider whether the functions of a software package alone are sufficient to realize what they truly want to accomplish. In this regard, flexibility is one key point. Flexibility is also essential for continual improvement of the system after installation of the product.
The ability to continually use the scheduler is vital for the scheduling operator's day-to-day operation and this makes serviceability an essential factor to consider when choosing a scheduler and is something that is not evident from the brochure alone. Systems that are not handy are gradually phased out.

Our production scheduler, FLEXSCHE GP, has both high flexibility and usability.

With the FLEXSCHE GP, you can freely define elaborate scheduling rules by process or by order that can be adapted to your industry type, factory or process circumstances in accordance with the desired application. Furthermore, the outstanding data-modeling ability boosts the flexibility for various applications.
Another characteristic is that through programming it is possible to freely build a system that surpasses the limitations and framework of the standard functions. This is a significant advantage of FLEXSCHE that is not found in other schedulers. The fact that it is not a black box provides a feeling of security for the future.
Of course, FLEXSCHE is by no means more difficult to use than other non-flexible schedulers. Data and rules for ordinary scheduling can be set easily. The true power and objective of "flexibility" is to be able to handle unique scheduling tasks and manage special demands by establishing elaborate settings. The great strength of a flexible production scheduler is that it has unlimited potential to deal with special, complex circumstances when they arise, both for now and the future.
Another major feature of FLEXSCHE GP is the usability and intuitiveness of the user interface. Use in combination with the product option FLEXSCHE Editor also makes the preparation of data easy, which has been an obstacle for schedulers.

Systems only have value when they do what they are supposed to do.

Useless systems have no value. Please choose a production scheduler by discerning whether or not it can fulfill the requirements of your factory, not by its apparent price or name recognition.
The name FLEXSCHE comes from a combination of "flexible" and "scheduler." Our company, FLEXSCHE Corporation, is committed to pursuing the rich, deep technology of production scheduling and will continue to develop schedulers that are truly "usable."

User Interface

Because the information of the production scheduler is huge and complicated, ease of use of the user interface, lightness and enhancement of functions are indispensable. We provide the highest standard operating environment for systems to be used in daily work.

Resource Gantt Chart Row

Displays the arrangement of tasks that use each resource. You can drag the operation to an arbitrary date and time or resource and fix it smoothly.
It is the chart row which is the center of the user interface.
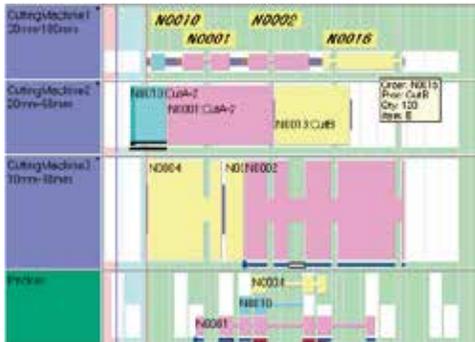
Display variation of resource Gantt chart rows

Order Gantt Chart Row

Displays a series of operations belonging to the order in chronological order.
You can easily grasp the relationship between retention time between processes and delivery time.

Display variation of order Gantt chart rows

Parameterization and Action

By defining "parameters" for various "processing" such as scheduling rules, chart generation, data input / output, etc., you can specify the target of processing execution.
Furthermore, by defining "action", you can execute processing with the "object" on the screen as a parameter.

The user interface of FLEXSCHE can also be expanded according to user's needs by programming.

Costume Function

Switch the display settings of each chart row (preparing multiple patterns in advance) at once.

Project Panel

The data is arranged like a tree, you can edit it and drag it to the chart.
It is also used for various chart operations, optional functions such as snapshot and editor.

Job Gantt Chart Row

Hierarchically displays complex processes of project type.
FLEXSCHE GUI Extension (optional product) is required.

Scheduling Panel

You can quickly open the scheduling rule setting dialog and execute scheduling.

Data Editing Window

Almost all data can be edited on FLEXSCHE.
FLEXSCHE Editor (optional product) is required.
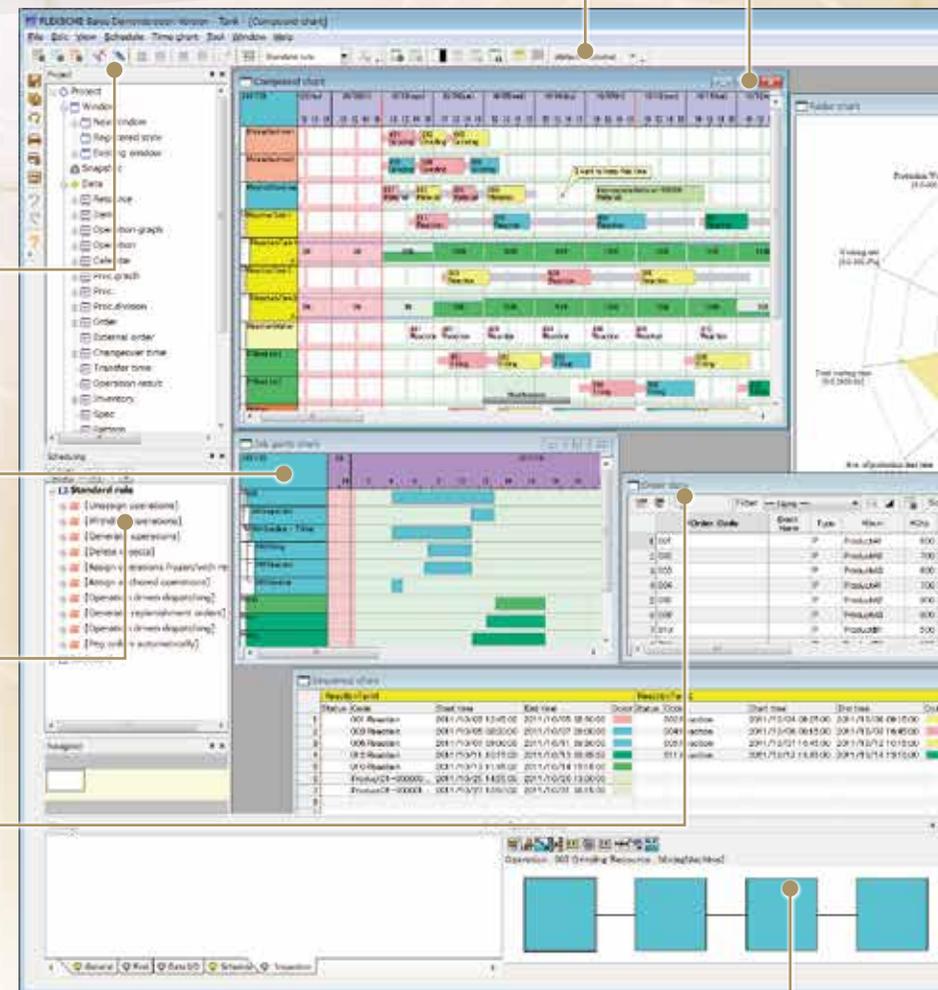
Operation Viewer

Graphically displays the network structure and task structure of the work clicked on the Gantt chart.
Conversely, you can search the displayed work on the Gantt chart.
FLEXSCHE GUI Extension (optional product) is required.

Chart Window

The horizontal axis shows time series, and the vertical axis shows various chart rows without limitation and displays it.

You can scroll/enlarge/reduce lightly with the mouse wheel. You can configure rows freely by dragging and dropping resources and items etc from the Project panel. Depending on the display setting, you can specify various contents such as display contents and operation method.

By registering these as styles, you can quickly display charts from various viewpoints. It also has advanced printing functions such as margin setting, advanced header/footer format specification, monochrome printing mode, synthetic printing, and so on.
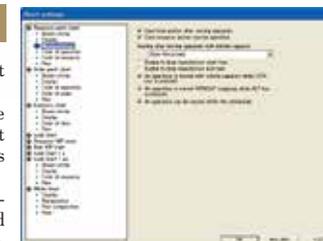
Display setting dialog

Process Editor

You can quickly edit the process network with intuitive drag and drop operation.

FLEXSCHE Editor (optional product) is required.

Inventory Chart Row

Displays the transition of the theoretical inventory quantity of the item and summary value per unit time.
You can also count for several items.
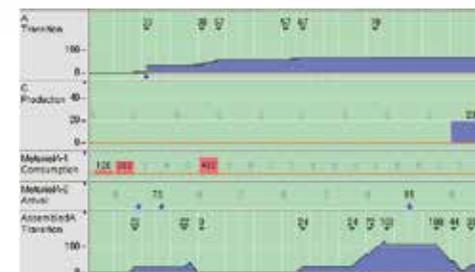
Display variation of inventory chart rows

Evaluation Data and Radar Chart

You can compile and analyze vast amounts of data at various points of incidence to generate evaluation data of multidimensional structure and then draw evaluation graphs based on it.

FLEXSCHE Analyzer (optional product) is required.

Window Separation Function

By detaching the internal window from the main window, you can efficiently browse and operate a large amount of data in a multi-monitor environment.

Load Chart Row

Displays the load factor or load per unit time of resources, or the color-coded configuration according to arbitrary attributes.
You can also aggregate multiple resources.

Display variation
of load chart rows

Bill of Resources Editing Panel

Edits the resources available in each process and their capability values.
FLEXSCHE Editor (optional product) is required.

Operation Panel

Displays a list of unassigned operations and selected operations. Display contents can be customized by setting. You can manually assign an operation by dragging and dropping it to Gantt chart.

Basic Modeling & Constraints

**FLEXCHE provides various functions and constraints for modeling diverse manufacturing processes.
The basics are as follows.**

Structure of Operation

One operation uses one primary resource (machine, facility, operation site, and such) and some subsidiary resources as needed (mold, operator, tool, electricity, and such). Each operation is comprised of as many as three parts: setup, manufacture and teardown. The manufacturing part's time changes depending on the capacities of the resources and manufacturing quantities. The setup and teardown parts can be fixed periods of time, or times determined by the relationship with the operation immediately before and after (for example, washing time is shorter when the operation involves applying coats of paint similar in color, and longer amount of time is needed when the colors are quite different).
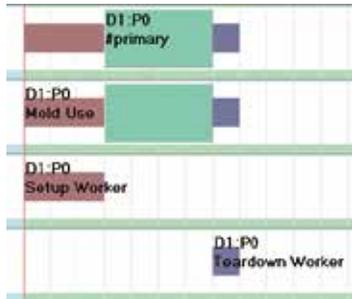
Task key	Setup	Manufacturing	Teardown	Candidate resources
"#primary"				Mold unit 1, Mold unit 2
"Mold"				Mold A1, Mold A2
"Setup operator"				Smith, Thomas, Baker
"Manufacturing operator"				Smith and Thomas
"Teardown operator"				Smith, Thomas, Baker and Palmer

Network of Operation

A finished product required by order is made via several operations. The process merging and divergence can be freely defined and the linking of operations can be expressed generally through a network. The quantity of intermediate items and raw materials needed to create the necessary volume of finished products is calculated based on the ratio defined in the master data.
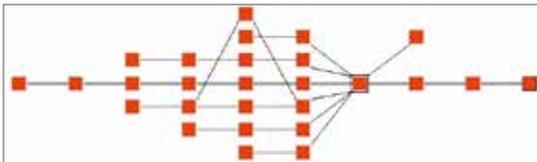

This structure can also be visually edited using the FLEXSCHE Editor.

In order to schedule, we have to abstract real factories and express them as data. Abundance of expressive power that is indispensable for planning excellent executable plan is one of the major features of FLEXSCHE.

Time Constraints Between Processes

Time constraints are set between two processes. When the overall process involves delivering items to the downstream process after they are all made in the upstream process, the time between the end of the upstream process and the start of the downstream process are constrained (ES). When items completed in the upstream process are immediately delivered to the downstream process without waiting for all of the items to be done as in flow operations, the time relationship between the start points and the end points are constrained (SSEE).
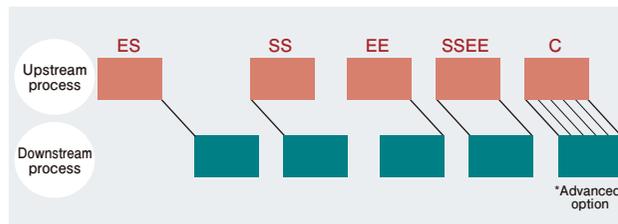

Minimum intervals between processes are set when there is a need for due times between processes and stand-by time for drying. Conversely, a ceiling is set for the time between processes when there is a need to introduce an item in a downstream process before it cools or decays, and scheduling is arranged based on compliance with these.
Times constraints can be set in detail using the Transfer Time Table (TTT) when there are different time constraints depending on physical distances between resources.

Calendar

This defines the time ranges during which operations can use the respective resources. The calendar can be used to define the usable time ranges by day and by resource with only a simple entry. Extended overtime and temporary stoppages for maintenance and the like are expressed with a free calendar. The resource Gantt chart can be used to easily add and delete information and usable time ranges can be moved, expanded and constricted by using the mouse. Changes in the number of operators, capacity and other data that differ depending on the time range (resource quantity) can also be defined in the calendar/free calendar.

Resource Spec. Constraints / Num. Spec. Constraints

Characteristics of work that can be manufactured for each resource (spec. / num. spec.) can be set in advance, and it can be distributed automatically by scheduling.
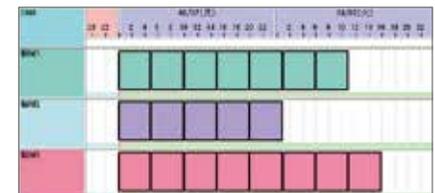
Scheduling with Awareness of Inventory

FLEXSCHE can perform various scheduling based on theoretical inventory.
Transition in the logical inventory volume can be confirmed on the Inventory Chart.

◆Inventory constraints for raw materials

When the inventory of a raw material is inadequate at the time a certain operation is started, the operation is started after a sufficient quantity of the material has arrived.

◆Replenishment production

An internal order is automatically placed to collectively cover supplies by designated quantity units and time periods so that items do not fall below predetermined minimum inventory volumes. Scheduling is put in place to see that inventory volume does not fall below the minimum level due to consumption of intermediate products.
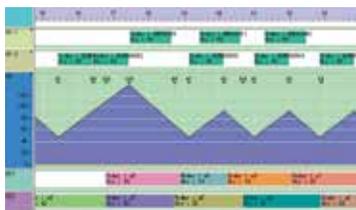
◆Designate the inventory pegging

It is possible to designate by order the volume of in-progress intermediate inventories to be pegged to in-progress processes.

◆Inventory control

It is possible to assign inventory, arrival amounts and shipped amounts for each item from outside parties.

Yield

Just by setting the yield rate in the process, the amount of material consumed to produce the target amount and the working time are adjusted at the same time.

Consumption quantity and working time become 1.25 times

100 pcs.   125 pcs.

Yield=1.0   100 pcs.   Yield=0.8   100 pcs.
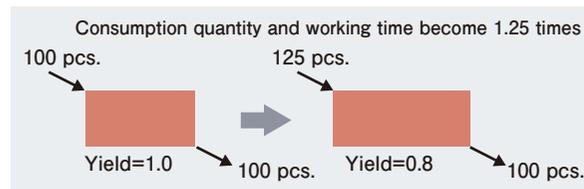
Type of Resource

Resources include "simplex resources" that can execute one task at the same time, "multiplex resources" that can execute multiple tasks at the same time, "variable capacity resources" where work efficiency changes according to available resources, "infinite capacity resources" that have infinite available resource quantity.
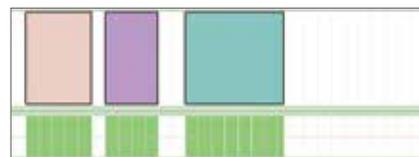
Simplex Resource
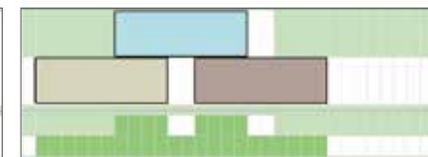
Multiplex Resource
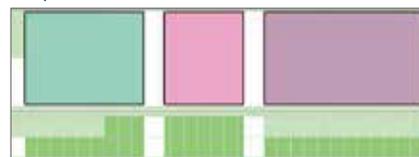
Variable Capacity Resource

Infinite Capacity Resource

Dynamic Changeover

You can make a changeover according to the relationship between attributes (sub resources, specs., numerical specs., items, arbitrary character strings) of work before and after on the resource.
It is also possible to freely define the changeover time according to the calculation formula.

Operation Results

It is rare that operations are performed perfectly, even when operational instructions are sent to the manufacturing site based on scheduling results. The plan and the operation site are synchronized by entering the operation results at the site and reflecting it in the next scheduling.
Detailed result information can be collected, such as operation progress, result collection time and the actual resources used.
However, this can be reflected with a certain degree of precision even if detailed result information is not returned by the operation site. It is also possible for the manufacturing site to split operations and withdraw operations that were split in the plan at it desires.

Operation Split

By dividing work and executing in parallel, manufacturing lead time can be shortened.
It is also possible to transport separately manufactured products individually.
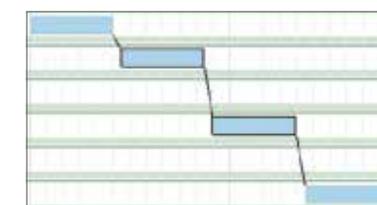
Before split

After split

Advanced Modeling & Constraints

In order to respond precisely to the diverse requirements of the manufacturing industry, it is necessary to have high expressive power and be able to efficiently model enormous amounts of data. It is a big advantage of FLEXSCHE that you can flexibly combine and use various functions prepared for that purpose. This page introduces some of the mechanisms that are provided to express advanced modeling and constraints.

Note: More advanced and special mechanisms are offered as advanced options (P.17).

Line Constraints / Resource Connection Constraints

You can limit combinations of resources used in the upstream and downstream processes.
There is a simple "line constraint" which defines belonging lines to resources, and there are "resource connection constraints" that can make complicated settings such as limiting by specific process alone or constraining between sub resources.
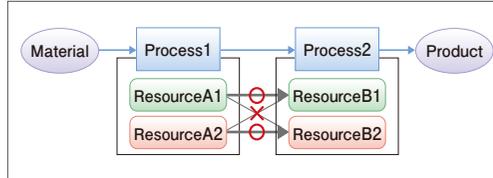

Parametric Process Definition

If the series of processes for manufacturing a product is similar to another product, you can share commonality and define only differences individually. This reduces the amount of data and makes maintenance easier. In addition, various variations are prepared in the method of calculating the quantity when generating operations from the order.
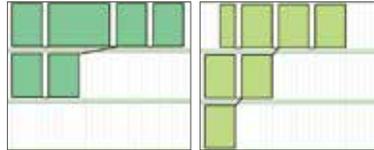

Combo Key

You can easily specify the combination of resources that one operation uses simultaneously. For example, it is convenient when a person in charge is fixed for each facility.
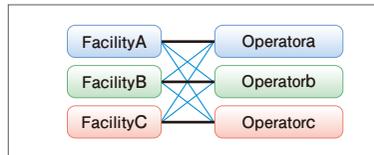

Operation time definition by calculation formula

You can define work hours using calculation formulas. It can express such a case where manufacturing time varies complicatedly depending on manufacturing quantity.
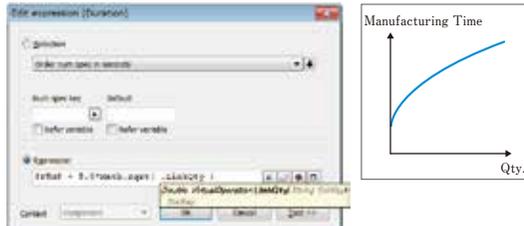
Concurrent conditions / Simultaneous loading constraint

Concurrent condition constraints are constraints that can only perform tasks with identical conditions in the same time period. In addition, simultaneous loading constraints start and end work at the same time.

Ignore concurrent conditions | Comply with concurrent conditions | Ignore simultaneous loading conditions | Comply with simultaneous loading conditions
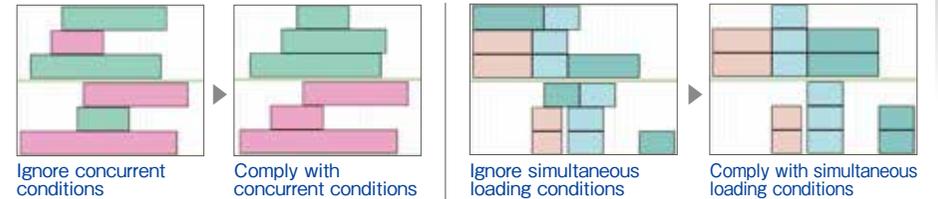
Process Template and Item Recipe

When process definition can be patterned, data maintenance is facilitated by sharing templates from multiple process definitions and describing only differences as differences (process template).
Also, it is possible to separate definitions of individual raw materials from the process master and apply them from each order (item recipe).

Dymanic Item Selection

Items to be used by operations or items to be generated as by-products can be determined according to conditional expressions when assigning operations. For example, you can switch the material items to be used depending on the allocated resources.

Product X

Material A: When producing 50 or more in Resource A
Material B: Other than that
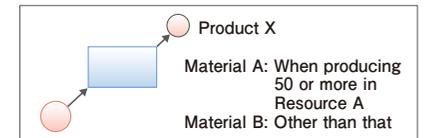
Formulas that can be described in various places in FLEXSCHE are powerful weapons for flexible operation / modeling / scheduling.
The user interface for entering calculation formulas is also substantial.

- ◎ Various evaluation values and conditions in the scheduling rule
- ◎ Designation of display color and display character string on chart
- ◎ Specification of file path
- ◎ Data mapping with FLEXSCHE EDIF
- ◎ Various constraints and capability values in master data
- ◎ Chart row composition rule
- ◎ Display contents and filter / sort condition of FLEXSCHE Editor
- ◎ Generation of evaluation data and form
- ◎ Parameters to be given at the time of executing various processes such as scheduling   etc.

Scheduling Rule

The term "Scheduling" actually represents diverse situations where the rules demanded of the scheduler differ by industry, factory and process.

- We want to run other operations in open time ranges after priority processing of rush orders
- We want to conduct scheduling with the material arrival timing, operator skills and planned operation shifts as constraints
- With regard to bottlenecked processes, we would like to rearrange the operations in an order where the changeover time becomes smaller to where due times are not delayed, and thus improve the throughput of the overall factory and to have the pre- and post-processes observe Just-in-Time
- We would like to simultaneously process multiple lots with matching temperature conditions within the thermal treatment process
- We would like to dispatch each process with differing conditions
- The product orders are for small lot production of many products, but we would like to produce common parts together in a large lot and allocate them to each order
- We would like operators to fill pallet changers with materials and tools in the evening and for automated operations to be conducted at night
- We would like to not start new operations near the end of a single day's operations, and push them to the following day
- We would like to transfer items that have undergone heat processing to the next process before they cool
- We would like to process things in the order of light to dark colors in certain processes or from wide to narrow items in others
- We would like to propose different rules for the next several days and for those thereafter

FLEXSCHE GP allows for arbitrary definition of scheduling rules so that this wealth of diverse demands can be met.

The scheduling rule of FLEXSCHE is defined by combining "Scheduling Method" which is a processing unit of scheduling.
The scheduling method is, so to speak, a "subroutine for production scheduling". Various settings can be made individually, and the behavior will change depending on the setting.

Scheduling Settings
- Scheduling Rule #1
- Scheduling Rule #2
- Scheduling Rule #3
- Scheduling Rule #4

〈Select One〉

Scheduling Rules
- Scheduling Method #1
- Scheduling Method #2
- Scheduling Method #3
- Scheduling Method #4

〈Executed in order〉

Scheduling Method
- Designate subjects for method processing
- Set method conditions
- Set method behavior
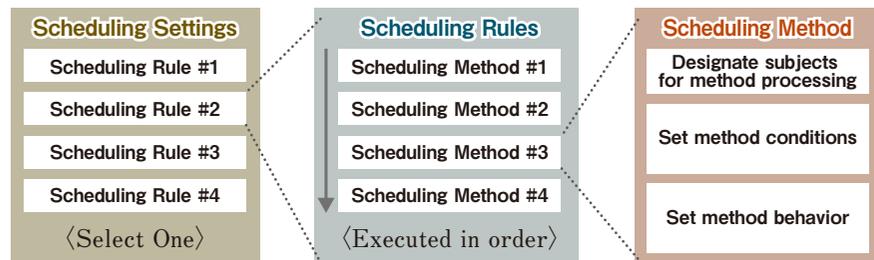
By making good use of these mechanisms, for example, the following advanced scheduling can be realized only with standard functions.

- Once we assign each order backwards to calculate the start date and time and then forward scheduling
- The finished product side is made to order, the parts side is lot production according to stock status
- If delivery delay occurs, manufacture can be outsourced

Scheduling rules are set from the dialog.
If advanced condition definition is required, it can also be represented by calculation formula.
Even in that case you can set it easily because there is an input guide function.

Dispatching Methods

Of the scheduling methods, there are various "dispatching methods" that perform particularly important functions in the scheduling process. They allocate operations in various ways.

Operation-driven dispatching method
Select the operation to be assigned and then select one of the candidate resources to be assigned to it. This step is repeated in a chain reaction fashion in accordance with the pre- and post-process relationships. It is the most common and quickest method.
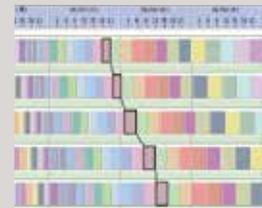
Resource-driven dispatching method
First, select the resource to be subject to processing and then select from the list of operations assigned to it and assign the operation. The user can designate detailed conditions for the subject resources and operation as well as priority standards. Since the order in which operation are lined up can be controlled, this method enables improved productivity in bottlenecked processes by reducing changeover times and contributes to the compiling of specs.
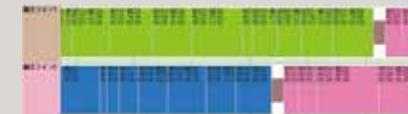
Elevating order resource-driven dispatching method
This is a resource-driven dispatching method that has been made easy to use by limiting control to the elevation order and line-up order. This is used when the operation is conducted while gradually raising and lowering the temperature, size, hue and such.

Simultaneous loading resource-driven dispatching method
This is a resource-driven dispatching method that simultaneously processes multiple lots with the same temperature, type or such processing conditions using a single resource. This is used for the batch processing of heat-treating furnaces and such.

Other scheduling methods are as follows.

- Operation generation method
- Object deletion method
- Operation assignment cancellation method
- Results and frozen operation assignment method
- Time-anchored operation assignment method
- Operation marking method
- Operation splitting method
- Forward reassignment method

- Backward reassignment method
- Replenishment order generation method
- Automatic order pegging method *1
- Order pegging authorization method *1
- Order pegging authorization cancellation method *1
- Structural description method
- External method calling method
- Operation withdraw method

- Propagate results method
- Order splitting method
- Update initial inventory method *1
- Data inspection method
- Property modification method
- Command execution method
- Calendar modification method *1
- MPS seeding / harvesting method *2
- Rule execution method
- Object marking method

, etc.

(As of April 2015) *1 Advanced options required *2 FLEXSCHE d-MPS required

Optional Products

FLEXSCHE GUI Extension

FLEXSCHE GUI Extension is an optional product for expanding the functions of the user interface.

Sequence Chart

It is a tabular chart for adjusting the operation sequence on each resource.
By dragging the cells of operation with the mouse, you can change the operation sequence on each resource or change the assigned resource of operations.

Snapshot Function

The overall data can be saved to a single file and restored via a simple operation arbitrarily. This makes it easy to line up and compare many different prepared schedules based on various conditions and to manage the various versions of data. It is also possible to freely select snapshots to be displayed on the chart rows.

Evaluation Charts

The scheduling results can be numerically evaluated by a variety of cross-sections and displayed on a radar chart.
This is also compliant with the Snapshot function.

Data Output for the FLEXSCHE Viewer

Data can be output for the FLEXSCHE Viewer. By transferring schedule data to a Web server, it is possible to refer to schedule results via the Internet and Intranet.

Operation Viewer

This graphically displays the operation task structure, network and a hierarchical structure of split operations. In addition to resource Gantt charts, this operates while linked to a variety of locations in the user interface, and it is even possible to search for operations displayed by the operation viewer from a Gantt chart (radar pointer display).
Furthermore, the displayed character information can be customized according to format character strings.

Job Gantt Chart

This is a chart for hierarchically visualizing large scale processes like heavy industry and large equipment manufacturing.
It drills down from large schedule to small schedule in tree form according to the structure freely defined in process division table.

Instruction Issuance

The operation instructions for each resource are issued in XML format. For instance, the instructions can be uploaded to the Web server, and then viewed from the operation site and easily processed using an external program. These operation instructions can be previewed and displayed in FLEXSCHE GUI. The display format described on the XSLT style sheet can be changed as needed.

WIP Chart

This visualizes the work-in-process conditions between processes from a variety of perspectives. There is the resource WIP chart that focuses on work-in-process before and after the resources, and an item WIP chart that focuses on the work-in-process of each item. This is a valuable index for obtaining optimal scheduling results.

Format Character String Editor

This edits the content of the character strings displayed in the chart and so on. The editing is done by intuitive operations – mainly drag & drop – so it is easy to build up the displayed contents without referring to the online manual.

Chart Window Automatic Row Composition Function

The layout of chart rows is automatically configured based on defined rules. Various methods have been prepared, including a simple method in which pre-defined rules are selected and an advanced method in which the extraction condition, display sequence and such used to determine the condition format, evaluation formula and such are freely described in detail. This automatically and quickly provides chart displays that always track data that changes daily.
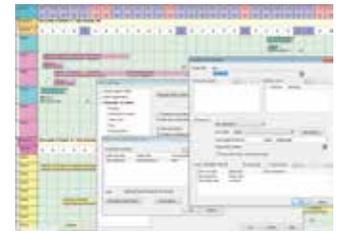
Hierarchical Function for Chart Rows

It is possible to roll up and group items by creating a tree-style hierarchical structure for chart rows. The hierarchical structure can be freely controlled using the "row insertion" function, pop-up menus and mouse buttons. Combining this function with the snapshot function and automatic row configuration function expands the application range.

Long-term plan Correspondence Display

You can switch the horizontal axis of the time series chart which was traditionally a daily unit to monthly or weekly units. In addition, you can set the aggregation period of the load chart / stock chart to be weekly or monthly in addition to hours and days.

Display Color Setting by Calculation Formula

Chart expression ability is improved by freely defining the character display color on the chart, the work, the display color of the left part of the chart, the marker color, etc. by calculation formulas. Transparent color (= non-display) can also be specified.

Dynamic HTML Display Function

It is possible to incorporate a page described in Dynamic HTML as a window or panel. Since all objects of FLEXSCHE can be accessed through script in DHTML, the function is not limited to simply displaying a Web page, but can also create ledger sheets and inputted forms, and build applications that move by using the latest Web technologies.
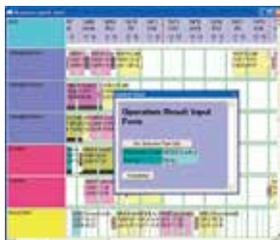
(Sample screen)

Chart Creation Support Function

This refers to a variety of function groups for easy preparation of compound charts that are related to a chart presently being displayed. For example, the development display of resource Gantt charts for operations derived from a specific order in an order Gantt chart can be shown. Specific operations can also be highlighted.

Report Viewer

The reports outputted by the data verification method and so on are provided in a visually friendly manner. There are functions for jumping to a Gantt chart, and for displaying select categories etc.
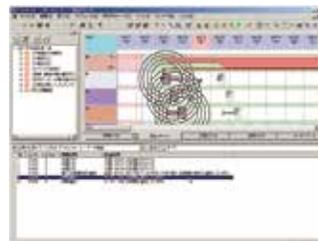
Structure Display of Load Chart

Groups the work constituting the load and displays it by color coding.
Classification methods can be flexibly defined from various viewpoints.
By clicking each group, the breakdown can be confirmed and operated on the Operation panel.
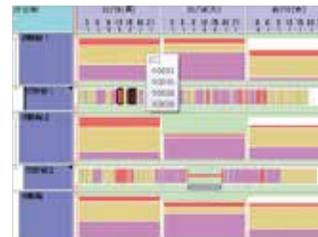
Chart Tag Function

You can paste a sticky note (memo tag) to an arbitrary position or operation of the time series chart, and display it or print it. You can also associate the contents of the sticky note with the comment character string of the work.
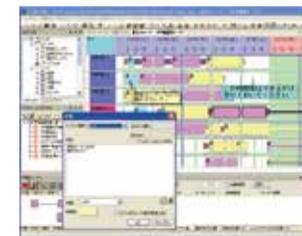
Permission Administration Function

When users perform various operations on FLEXSCHE, this automatically judges if the user is permitted that operation to the data based on permission definition. Furthermore, it prohibits the user from performing the operation when it is not allowed.

Level Display

This draws the line representing minimum/standard/maximum level in Inventory charts, Load charts, WIP charts, and displays warnings if the value falls out of range. If the levels fluctuate by time zone, multiple patterns can be defined and can be switched to it.
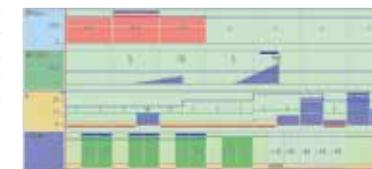
The functions of FLEXSCHE GUI Extension are constantly being expanded. Please contact Distributor regarding the latest functions.

Optional Products

FLEXSCHE Editor

The master data of the production scheduler – in particular, the definitions of processes – are complex and previously were an enormous barrier to system installation.
The workload of data creation and preparation, however, can be reduced
and the efficiency can be dramatically enhanced by incorporating FLEXSCHE Editor
into FLEXSCHE GP. FLEXSCHE Editor can create data with intuitive operation of the graphical screen.
FLEXSCHE Editor can be used while incorporated into FLEXSCHE GP and also as a standalone function.

Process Editor

The process network structure can be easily created and edited using the mouse. Settings regarding links between processes, input/output items and associate usable resources can be performed quickly.
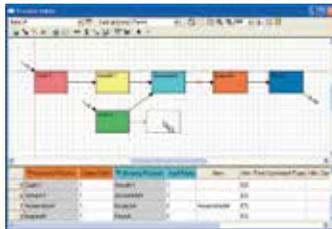
BOM Editor

This is comprised of two tables: one is for editing the hierarchical structure of BOM, and the other is for editing the process graph of BOM. BOM and the process graph can easily be edited primarily by the input from the keyboard.
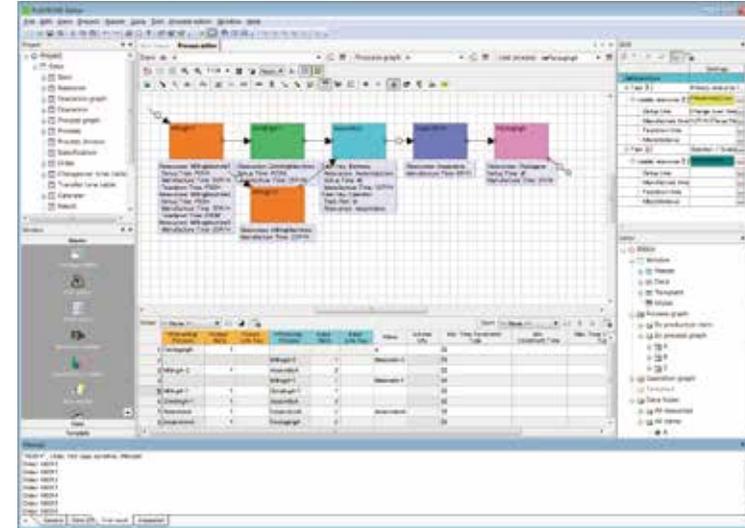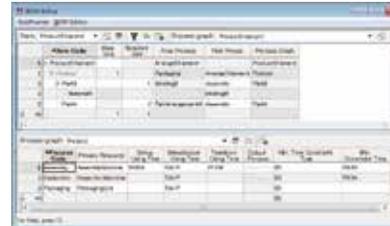
Operation Editor

This establishes the operation network structure, performs settings regarding links between operations, and associates usable resources. This is used when processes are individually defined in relation to the order. It is very effective, particularly when used to manage make-to-order production.
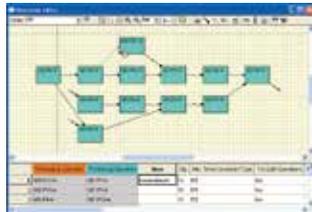
Synchronous Editing by Multiple Users

The connection of multiple FLEXSCHE Editors to FLEXSCHE Communicator with Core/GP enables multiple users to simultaneously edit different process graphs.

Data Editing Window

This displays and edits data related to scheduling. It is possible to easily and reliably create data using the function for error detection and hint functions.

◆Filtering and Sorting
By predefining some conditional expressions, you can quickly switch the lines to be displayed and the display order.

◆Multi-view
In accordance with the purpose, you can define multiple "views" that narrow down the rows and columns beforehand. Edits made on the view are immediately reflected in the original table window.

◆Key Field Separation
By defining specs., num. specs., flags, comments as independent fields, they can be efficiently edited and viewed.

Skill Table Editor

Skill values can be input from a matrix screen on which the vertical axis defines resources and the horizontal axis skill types.
The operating time can be calculated based on these values. In addition, the resource will be regarded as unusable if a skill is not input.

Template Function

This can efficiently create new process graphs and operation graphs based on pre-registered template modeling of process flows. It demonstrates its potential when creating data for factories with a variety of subtle variations to their manufacturing patterns, and for make-to-order production such as mold manufacturing where process definitions are needed for each individual order. It is also possible to automatically create templates from existing data.

FLEXSCHE EDIF

The production scheduler will have a wide range of applications when its data is made in cooperation with an external system.
FLEXSCHE EDIF is a mechanism for realizing advanced cooperation by mapping FLEXSCHE internal data and external data sources such as databases.

Data collaboration with peripheral systems is an important issue when introducing a production scheduler, but by using FLEXSCHE EDIF (External Data Inter-Face), it is possible to easily synchronize FLEXSCHE external data (database and file) with FLEXSCHE data.

With FLEXSCHE EDIF, you can direct-ly associate the FLEXSCHE data with the database used by the external system using the attached data mapping tool. Input and output of differential data, which has been a difficult problem in tra-ditional integration, and data exchanging function by calculation formula are equipped as standard. Therefore, production costs for developing interfaces are drastically re-duced, making it easier to be connected with ERP or a production management system operated on a database.
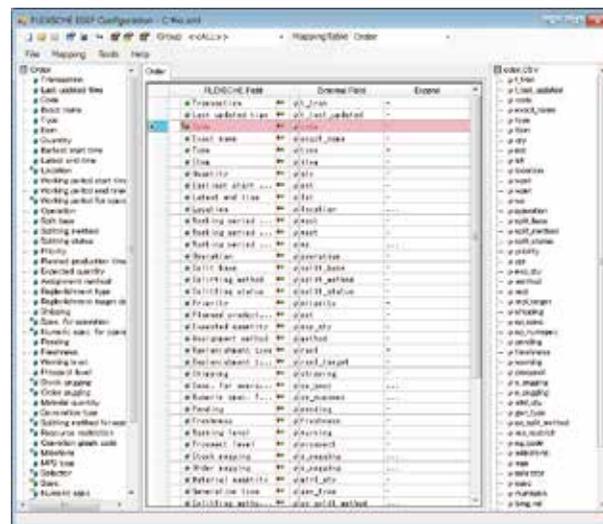
Data mapping tool
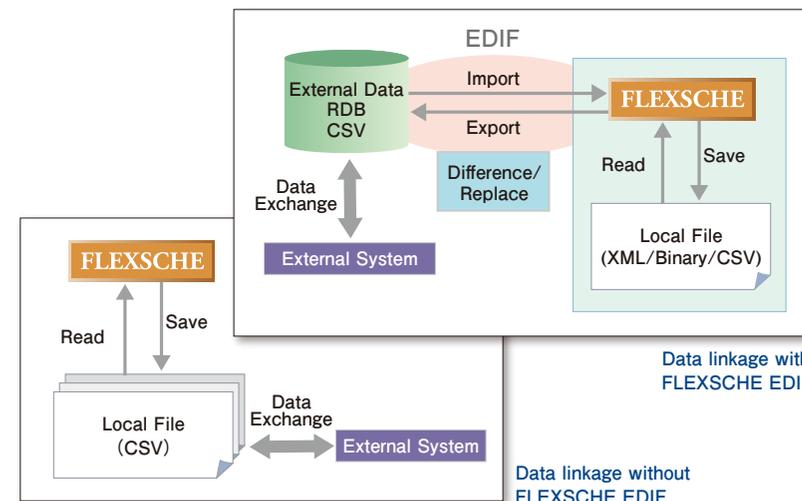
In addition, since it has a mechanism to import and export one table on FLEXSCHE in a relational format, an efficient deployment process can be expected that makes maximum use of the skills for database operations such as SQL that most of system integrators possess.

Data linkage with FLEXSCHE EDIF

Data linkage without FLEXSCHE EDIF
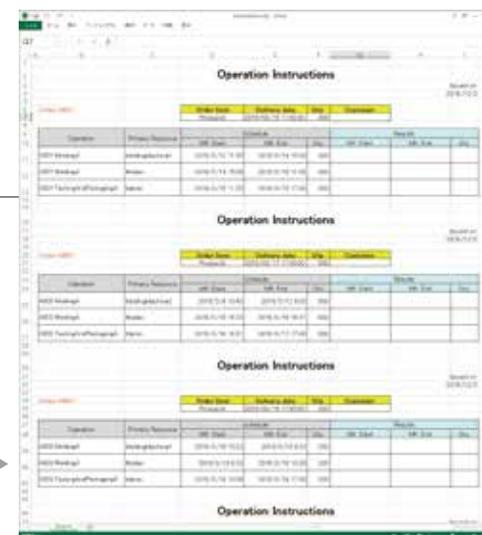
Excel® form generation function

Various forms such as operation instructions and arrival schedules can be output as Microsoft Excel® files. You can design the layout and composition of the form on Excel® that is familiar to use. Complex forms with multi-level structure including barcode etc. can also be easily designed.
Using EDIF's advanced data mapping function, you can flexibly define the information and form to be exported.
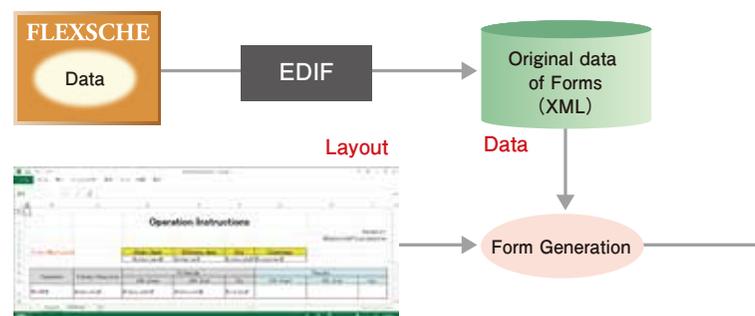
Layout definition file (Excel®)

Generated form (Excel®)

Optional Products

FLEXSCHE d-MPS

In industries where it is inevitable that manufacturing is undertaken at a stage when demand is not finalized, it is difficult to decide appropriate production volumes in advance, and this becomes a factor that hesitates the introduction of the production scheduler. FLEXSCHE d-MPS is a mechanism that decides appropriate amounts by responding to demand that changes stochastically based on simulations carried out by the production scheduler as needed. FLEXSCHE d-MPS is an innovative supply-demand balance adjustment system for potential production.

For industries that constantly produce items while forecasting demand, such as food manufacturers and daily necessities manufacturers, or for industries that are obliged to preproduce based on unofficial notice information, such as automobile parts manufacturers and electronic parts manufacturers; "uncertainty and short-term fluctuation of demand" continues to be a burden. It is a difficult task to control the amount of product inventory to fill the gap between daily production and fixed demand. If the skillful manipulation of accelerator and brake in a number of varieties is neglected in any way, waste product inventory will build up immediately, or conversely a sudden shortage of items will occur, and the manufacturing site will be swayed by fluctuations resulting in confusion.

— Is this the result of the accuracy of demand forecast being low?
— Is this the result of inventory level being low?
— Is this the result of the frequency of the manufacturing-and-sales adjustment meeting being low?

This is not the true nature of the problem. The problem is that we lack the mechanism to foresee the possibility of trouble and quickly cope with it properly. To simulate future conditions with precision, to observe and compare the transition of estimated demand and possible supply, and to quickly deal with problems as they arise; these are the right approaches to the "uncertainty and short-term fluctuation of demand".

Demand which fluctuates daily with stochastic width should not be used as the request to the factory as is. While referring to the trend of the future demand amount, by determining the demand amount independently, it is possible to deal promptly when the red light turns on while protecting the manufacturing site from confusion.

To visualize and grasp correctly the trend of probabilistic demand amounts from the past to the future. To properly determine the amount of requests to the factory based on this. And to calculate and check the supply quantity based on the accurate production capacity of the factory. These can never be achieved by the business cycle relying on the conventional MPS (Master Production Schedule) and the manufacturing-and-sales coordination processes.

Always observing the future supply and demand balance, foreseeing the excess or deficiency, and adjusting the request amount promptly and accurately... FLEXSCHE d-MPS is an epoch-making production planning solution that directly addresses the urgent demand of the manufacturing industry, which naturally must deal with "uncertainty of demand and short-term fluctuations", yet this could not be realized so far.
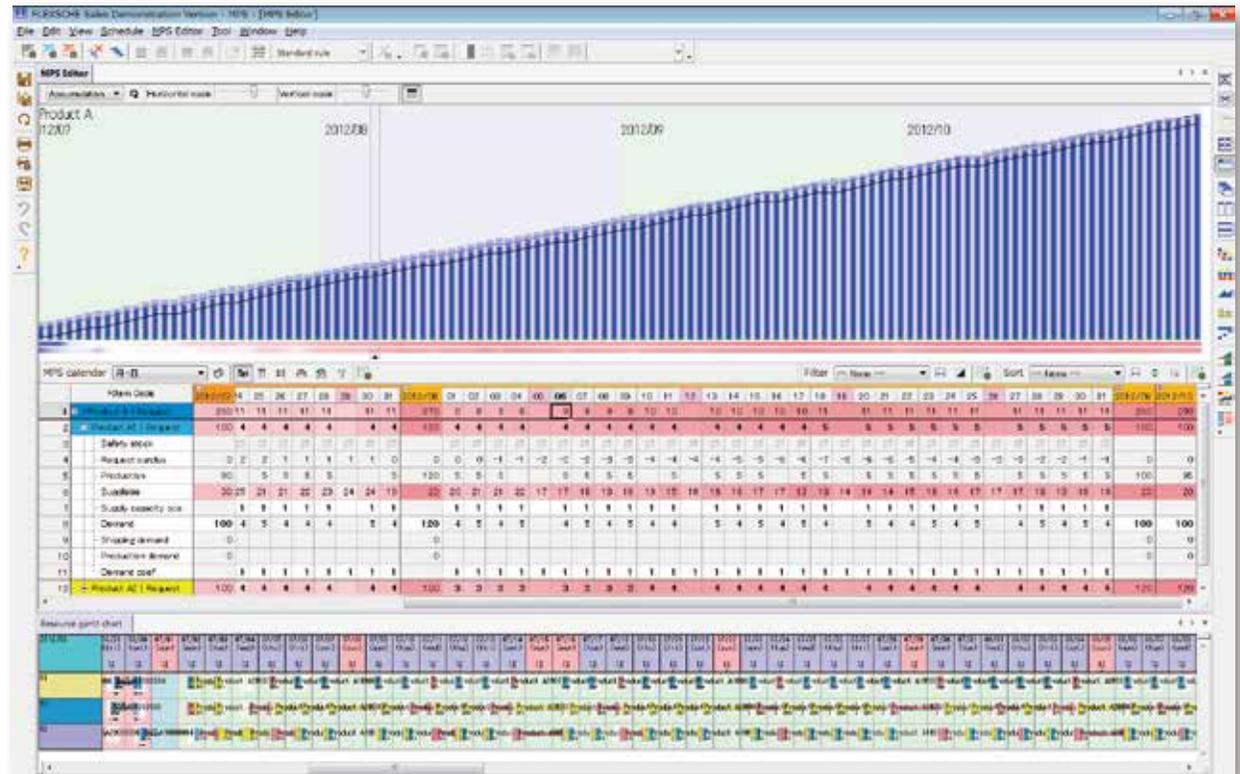
In the manufacturing industry that can begin manufacturing after the shipment is confirmed, we can respond to demand reliably, as long as it can be properly implemented after planning an appropriate manufacturing plan. On the other hand, however, many manufacturing industries that have to start manufacturing before the timing of shipment and quantity are confirmed are exposed to "uncertainty of demand and short-term fluctuations", so that no matter how planning is precisely made, it is inevitable that difficulties will be faced.

| Unnecessary product inventory accumulates | Difficulty adjusting the balance among many types |
| Unexpected product shortage frequently occurs | Production site is swayed by demand fluctuation |

FLEXSCHE d-MPS is a tool for directly solving these problems. We will withdraw from the "waterfall type production schedule" controlled by the rigidified standard plan deriving from the initial prospective demand amount, and will open a way to switch to a new paradigm that should be called an "adaptive production schedule" that constantly checks the impact of future daily demand and readjusts it as soon as necessary.

However, frequent plan changes will confuse the manufacturing site. Therefore, FLEXSCHE d-MPS requires the factory to have an extra margin to absorb fluctuations within the stochastic theoretical range, and only when there is a fluctuation beyond that assumption, will make careful adjustments while paying attention to the impact on other products. In the situation where factory resources are limited, there is no leeway to accumulate inventory, so it may be required to monitor inventory status more stringently and deal with it more cautiously. In such a case, a visual alert function that can grasp the degree of urgency at a glance will strongly support the planner. No matter how good a plan of production (shipping plan) is devised, it is only a pie in the sky unless feasibility is supported. It is also one of the features of FLEXSCHE d-MPS that it is possible to always confirm the validity of the production plan by dedicated simulation of the production scheduler to derive the actual suppliable quantity of the factory.

FLEXSCHE d-MPS provides an environment for visualizing future possibilities, constant monitorization, foreseeing excess and deficiency, and accurately determining the amount of demand to the factory.

How to read the MPS editor graph

95% Confidence Level
Even if the demand amount cumulative value fluctuates, the possibility of exceeding it is 5%. It is a measure to adjust the requested amount.

Safety Stock Volume

Daily Requirement

Available Supply Capacity of the day

Demand Amount Cumulative Value
It accumulates the daily demand amount. It will fluctuate as prospecting demand replaces fixed demand.

Request Amount Cumulative Value
It accumulates the daily requested amount. In anticipation of the fluctuation of demand cumulative value, set it higher with 95% confidence level as a guide.

Fixed Demand Amount Cumulative Value

	Waterfall Type Production Schedule Old master production schedule (MPS)	Adaptive Production Schedule FLEXSCHE d-MPS
Information Flow	One-way	Bidirectional
Update Cycle	Once - several times a month	At any time
Trigger and Means of Readjustment	Manufacturing-sales adjustment meeting, etc.	Alert display with stochastic prediction and interactive operation
Reflecting Production Capacity	Rough load estimate	Precise simulation (scheduling)

Factory
Produce
Manufacturing Site
Production Scheduler FLEXSCHE

Request
Prospective demand
Demand
Supply
Confirmed demand
Replace

Supply-demand balance adjustment system **FLEXSCHE d-MPS**

Features of FLEXSCHE d-MPS

Integrated with production scheduler
- Excess or deficiency in future supplies can be predicted promptly
- Because feasibility is confirmed by finite capacity simulation, a highly reliable production plan can be devised

Visualize the trend of supply-demand balance
- Color coding enables excesses or deficits from the present to the future to be grasped at a glance
- Since the impact of changes is instantly reflected, adjustments can be made efficiently and accurately
- By comparing the state of many different items, you can make adjustments in an equitable manner

Optional Products

FLEXSCHE Analyzer

The production scheduler can be said to be a highly modeled virtual factory,
and the various data accumulated in that factory is definitely "a mountain of treasure".
By analyzing various indicators extracted from it in a diverse manner, we can obtain valuable information for the manufacturing industry.
**This is useful not only for planning tasks but also for making business decisions. The mechanism that provides means for that is FLEXSCHE Analyzer.**

FLEXSCHE Analyzer aggregates data in FLEXSCHE in a user defined manner and generates "data cube (hierarchical multidimensional data)". In "Data Cube Viewer" that allows browsing of the data cube, the axis to be displayed can be specified, as well as opening and closing of the data hierarchy, so an enormous amount of information can be grasped efficiently and multilaterally.

You can further extract values from the data cube at any point and create graphs.

- ・Line graph
- ・Bar graph / Horizontal bar graph
- ・Pie chart
- ・Bubble chart
- ・Scatter plot
- ・Radar chart

* As of April 2015

	2014	Oct.	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Product	440.0	335.0	0.0	0.0	10.0	0.0	0.0	0.0	20.0	0.0	30.0	40.0	0.0
A	160.0	130.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	0.0
B	230.0	165.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
C	50.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
Material	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intermediary	1200.0	930.0	0.0	40.0	0.0	160.0	40.0	0.0	0.0	0.0	200.0	40.0	0.0
AssembledA	640.0	520.0	0.0	40.0	0.0	120.0	0.0	0.0	0.0	0.0	160.0	0.0	0.0
AssembledB	460.0	330.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	40.0	40.0	0.0
AssembledC	100.0	80.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0

It is also possible to visualize the built-in evaluation indicators in a radar chart. By superimposing multiple simulation results, it can also be used for tuning scheduling rules.

- Avg. working time
- Avg. / Total changeover time
- Ct. of unassigned operations
- Ct. of delivery delay
- Avg. delivery time margin time
- Avg. production lead time
- Ct. of changeover occurrences
- Total detention time
- Resource utilization rate   etc.

FLEXSCHE Analyzer can be used in the following situations, for example:

- ◉ Analyze the long-term capacity utilization rate and delivery-time compliance rate to make use of judgments on capital investment
- ◉ Analyze inventory quantity and fluctuation in demand and evaluate the adequacy of the safety inventory quantity set for each part
- ◉ Precisely compile manufacturing cost and production lead time for each item and reflect it in the product mix plan
- ◉ Analyze the setup occupancy rate and facility operation rate in equipment and make use of it for improvement in the field
- ◉ Quantify delays and waste of processes and aim for better planning

Since the graph is created as an HTML5 file, it can be viewed not only on the screen of FLEXSCHE but also with a web browser.

FLEXSCHE GP Advanced Options

This is an extension to provide modeling tools and constraints to meet special requirements. In introducing production scheduler, it often turns out that the operational constraints and rules that were not initially recognized are later important. FLEXSCHE GP advanced option is an extended function group to flexibly cope with such situations.

A. Dynamic Splitting for Simultaneous Loading `2 Units`

In the case of simultaneous loading processes such as batch annealing and thermal treatment, the operation is dynamically split and assigned in accordance with the availability of resources. It can also assign the operations to multiple resources. It functions both in Resource driven dispatching and Operation driven dispatching.
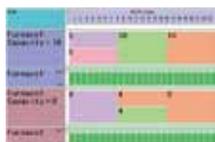
B. Resource Occupation `2 Units`

This reserves resources even between operations so that they are not used for other operations. In a reaction process, for example, this is effective when use of a device is to continue to be reserved until emission even after the reaction is complete.

C. Consecutive Flow Control `1 Unit`

This expresses the time relationship between processes for delivering generated products as needed even while they are being manufactured in pre-process and enabling them to be used in post-process. This can also handle a situation in which the relationship between processes is N to M due to order allowances and such. The steps taken at the site to reduce lead time can also be
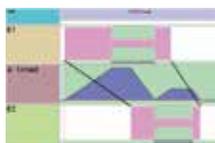
D. Automatic Order Pegging `1 Unit`

This automatically allots replenishment orders for materials and intermediate products to the orders requiring them so that they are not consumed by other orders.

E. Maintenance Operation Assignment `2 Units`

This dynamically generates operations based on conditions during assignment, and assigns them at the prescribed time. For instance, this can be used to conduct maintenance when a machine has been operating for 300 consecutive hours.

F. Dynamic Splitting for Resource Capacity `1 Unit`

This automatically splits and allocates operations so that each resource to be used falls within the ceilings and floors established for their capacity. It also generates replenishment orders according to the resource capacity of the final process.
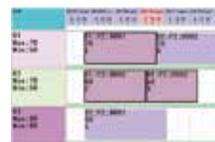
G. Safety Inventory Control `2 Units`

This enables replenishment production for fluctuating inventory levels by changing safety inventory depending on the season.

H. Automatic Order Splitting `1 Unit`

This splits orders to the specified number by order splitting method, and equally set latest end time or manufacture start time within a specified period. This is useful when make-to-stock production schedules to manufacture monthly production split by weeks.
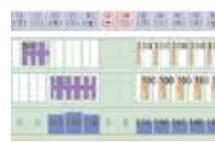
I. Minimum Time Constraints between Processes for Splitting `1 Unit`

When the upstream/downstream processes are split and the ratio between them does not accord, the connection line is linked to middle of the operation so that each splitting ratio corresponds. This imposes a minimum time constraint to that point.
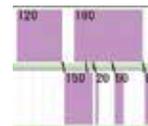
J. Initial Inventory Control `1 Unit`

By using the initial inventory updating method, and by recording the theoretical inventory volume of the certain time in the past as initial inventory, scheduling taking into account inventory volume can be achieved without depending on the actual inventory information.
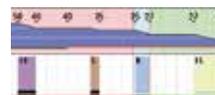
K. Consumption Expiration of Items `2 Units`

Maximum period of time can be set for the items from being manufactured to being consumed. In replenishment orders generation and automatic order pegging and so on, inventories which are out of time are treated as having been wasted.
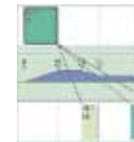
L. Squad Resources `2 Units`

Maximum period of time can be set for the items from being manufactured to being consumed. In replenishment orders generation and automatic order pegging and so on, inventories which are out of time are treated as having been wasted.

M. Items Subdivision `2 Units`

This enables the modeling of locations of the items. By defining locations, the inventory volume of each location can be visualized. Schedules considering the case in which the same items are located in different places can also be designed. This is useful for the scheduling where the manufacture spreads over multiple bases.

N. Calendar Modification `2 Units`

The calendar setting method can automatically adjust resource uptime. You can automatically set the minimum overtime work required to keep the delivery date or use it for simulation when the amount of electricity is restricted.

FLEXSCHE GP advanced option limits the total number of optional units used depending on the maximum number of licensed units. Multiple selections can be made freely within the range restrictions. FLEXSCHE GP Advanced options will be added from time to time. For the latest version, please contact us separately.

Optional Products

FLEXSCHE Communicator

**A superior effect can be obtained by cooperating and collaborating with the production scheduler
not only by one planner but also by various people involved in production.
FLEXSCHE Communicator is a revolutionary server product that realizes a true scheduling system
by sharing and utilizing the mechanism and information of the scheduler in real time.**

B FLEXSCHE Communicator Basic
C FLEXSCHE Communicator with Core
G FLEXSCHE Communicator with GP

Sharing the Schedule among Multiple Scheduling Operators **B C G**

A system is provided where multiple scheduling operators can safely share a single project. While a single scheduling operator has the rights to the scheduling and data editing, the other planners can only view the schedule and cannot make changes. It is also possible to verify who presently has the rights, and to send that person a message.

Simultaneous Data Editing by Multiple Clients **C G**

This provides an environment in which multiple users can simultaneously edit data for a single project on the server. Each planner's FLEXSCHE Editor is connected to the FLEXSCHE Communicator and they can change the data in parts. For instance, when a person begins editing the process flow modeling of a completed item, others cannot edit it until the former person returns the edit rights, but they can edit the process flow modeling of other completed products.

Simultaneous Operation Adjustment by Multiple Clients **C G**

This provides an environment in which multiple users simultaneously adjust a single project operation on the server. Each of the FLEXSCHE clients are connected to the FLEXSCHE Communicator and can adjust the allocated status of the operation they have been entrusted with. For example, when a person starts to move a certain operation, others cannot move that operation until all operations are completed, but can move separate, unrelated operations.

Exchanging Messages and Sending/Receiving Data **B C G**

A dynamic operating environment in which messages are exchanged through connected Web browsers among multiple clients is provided. This serves as the foundation for such operations as building a system in which scheduling results immediately prepared based on a tentative order are returned in real time to provide a due time response. Messages sent from clients can be processed by other clients connected to not only the server, but also the FLEXSCHE Communicator. In the event these cannot be processed immediately, "asynchronous processing" where processing is temporarily suspended is also possible. This is further usable as a real-time interface for exchanging data with external systems.

FLEXSCHE Viewer

Other systems

Custom-made dedicated client program

Web server IIS/.NET

Scheduling

GP scheduling engine

FLEXSCHE Communicator

Scheduling

Scheduling

Scheduling

Database

FLEXSCHE Editor

FLEXSCHE GP

Various Web clients

FLEXSCHE Editor
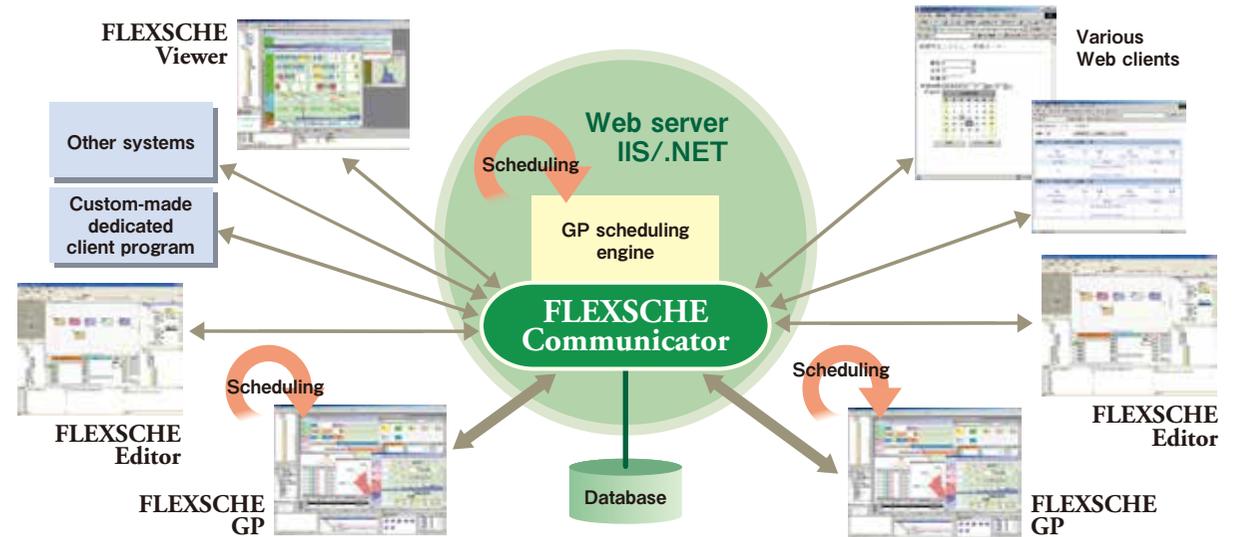
FLEXSCHE GP

Server Scheduling **G**

FLEXSCHE Communicator with GP comes equipped with the FLEXSCHE GP's scheduling engine, and advanced scheduling can be done automatically. The finished schedule can also be immediately shared with everyone. The execution of scheduling after connecting FLEXSCHE GP to FLEXSCHE Communicator with GP provides the option of processing the information on the server or to run it on your own machine after obtaining rights.

Viewer Data Distribution Function **B C G**

Automatically pushes the latest schedules to the connected FLEXSCHE Viewers, and operation results that have been inputted from the Viewer are incorporated.

Development Environment for Building Scheduling System **B C G**

FLEXSCHE Communicator is also used as a platform for building a scheduling system that depends on dynamic data exchanges. Therefore, it is possible to efficiently develop applications that match the respective operations.

Information for Integrator

◉ The FLEXSCHE Communicator runs on a .NET Framework.
◉ The programming interface for the message relaying function is disclosed as a Web service and client development is completely open.
◉ Applications on FLEXSCHE Communicator are run basically as a configuration of programming in a .NET compliant language and XML setting files.
◉ Many of the attached application programs have source codes, and it is possible to partially reconstruct these and then use them.

FLEXSCHE Viewer

This is a client program for viewing issued scheduling results.
By simply uploading the schedule data to the Web server or to the folder shared on the file system, you can easily share the entire schedule information with many people.

FLEXSCHE Viewer

Manufacturing plan

FLEXSCHE Viewer ← Web server

Web browser ← ← Web browser

Operation instructions

Upload scheduling results in XML format

FLEXSCHE GP
with
FLEXSCHE GUI Extension
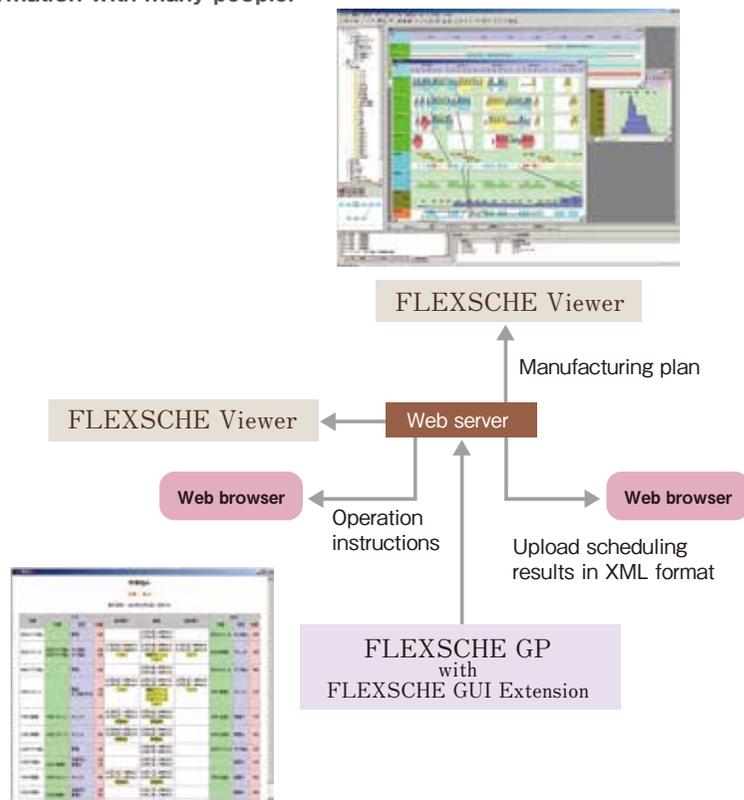
With a feeling exactly the same as the FLEXSCHE GUI, it combines various charts and displays it diversely.
The FLEXSCHE Viewer includes some of the functions of the FLEXSCHE GUI Extension.
By connecting the FLEXSCHE Viewer to the FLEXSCHE Communicator, it becomes possible to perform push type delivery of the latest schedule and input of operation result from the Gantt chart.

> In order to create schedule data (FDSS data) for FLEXSCHE Viewer, it is essential that FLEXSCHE GUI Extension is built in FLEXSCHE GP.

Operation Cycle

The following is the common flow of the FLEXSCHE operational cycle. Creating and maintaining a smooth flow of information as the core of the production system is also an important role of the production scheduler.
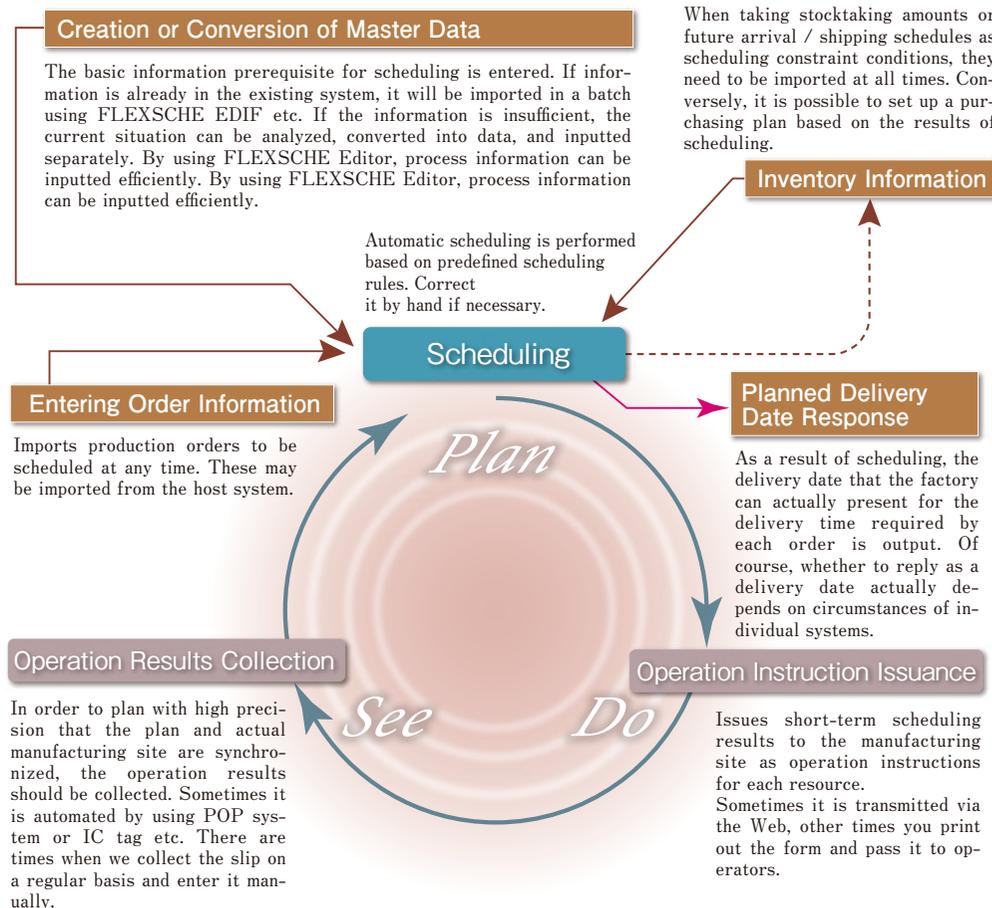
Creation or Conversion of Master Data

The basic information prerequisite for scheduling is entered. If information is already in the existing system, it will be imported in a batch using FLEXSCHE EDIF etc. If the information is insufficient, the current situation can be analyzed, converted into data, and inputted separately. By using FLEXSCHE Editor, process information can be inputted efficiently. By using FLEXSCHE Editor, process information can be inputted efficiently.

When taking stocktaking amounts or future arrival / shipping schedules as scheduling constraint conditions, they need to be imported at all times. Conversely, it is possible to set up a purchasing plan based on the results of scheduling.

Inventory Information

Automatic scheduling is performed based on predefined scheduling rules. Correct it by hand if necessary.

Scheduling

Plan

See   *Do*

Entering Order Information

Imports production orders to be scheduled at any time. These may be imported from the host system.

Planned Delivery Date Response

As a result of scheduling, the delivery date that the factory can actually present for the delivery time required by each order is output. Of course, whether to reply as a delivery date actually depends on circumstances of individual systems.

Operation Results Collection

In order to plan with high precision that the plan and actual manufacturing site are synchronized, the operation results should be collected. Sometimes it is automated by using POP system or IC tag etc. There are times when we collect the slip on a regular basis and enter it manually.

Operation Instruction Issuance

Issues short-term scheduling results to the manufacturing site as operation instructions for each resource.
Sometimes it is transmitted via the Web, other times you print out the form and pass it to operators.

> The operation cycle runs on a case-by-case basis, from several times a day to once a month. The data interface also varies depending on the peripheral system. Naturally, the actual operation form is vastly different from company to company, and the ideal system should be built carefully and with much consideration. The ability to respond to these diverse needs at a high level is also a strength of FLEXSCHE providing a high degree of flexibility.

Connection with Other Systems

The input / output data of FLEXSCHE is a completely open CSV format (a comma delimited text file) independent of a specific database, so you can easily establish cooperation with an external system. Also, if you use the optional product FLEXSCHE EDIF, you can easily synchronize with external system data via the database.

Suite Products & Price List

Suite Products

Products that are generally considered necessary are packed and offered at a reasonable price.
Please consider to your individual needs.

	FLEXSCHE GP Advanced Pack	FLEXSCHE GP Complete Pack
Price	**4,800,000 JPY** (Equivalent to a total of 5,600,000 JPY)	**6,000,000 JPY** (Equivalent to a total of 7,600,000 JPY)
FLEXSCHE GP *1 **FLEXSCHE GUI Extension** **FLEXSCHE Editor** **FLEXSCHE GP Advanced Options** **FLEXSCHE EDIF** **FLEXSCHE Analyzer** **FLEXSCHE GP Training** *1	○ ○ ○ 3 Units ○ (Either one) 18 lessons *2	○ ○ ○ Unlimited ○ ○ 36 lessons *3

* 1. If the data volume exceeds 250 thousand operations, please add the large data option (1.6 million JPY).
* 2. Participation in the annual maintenance program permits re-attendance to 9 lessons.
* 3. Participation in the annual maintenance program permits re-attendance to 18 lessons.

	FLEXSCHE Communicator Regular Pack
Price	**7,800,000 JPY** (Equivalent to a total of 9,900,000 JPY)
Server products **FLEXSCHE Communicator with GP** *1 **FLEXSCHE GP Advanced Options** *2 **FLEXSCHE EDIF** *2	○ Up to 3 units ○
Client products **FLEXSCHE Communicator Client** **FLEXSCHE GUI Extension** **FLEXSCHE Editor** **Network license compatible function** *3 **FLEXSCHE Communicator Training**	2 licenses 2 licenses 2 licenses ○ 2 people

* 1. 1 project   * 2. For FLEXSCHE Communicator   * 3. For FLEXSCHE Communicator Client   * All amounts are exclusive of consumption tax

FLEXSCHE License Types

Depending on your usage environment, three licensing types can be chosen from:

Single license
Insert "license key" on USB port of individual PC that you run FLEXSCHE and activate license at any time when FLEXSCHE is executed.
Although it is possible to use another PC by replacing the license key, it is not recommended because there is a risk of losing or damaging the key.

Network license
Recommended when you want to use from an un-specified PC. The upper limit of the number of simultaneous activation of FLEXSCHE in the same network is limited. Any PC running at all times in the network is used as a license server. It is necessary to purchase "Network license compatible function" additionally.

Terminal services license
Run FLEXSCHE on Windows Terminal Server and operate from any terminal. The upper limit of the number of simultaneous activation of FLEXSCHE on Terminal Server is limited.
It is necessary to purchase "Terminal services license compatible function" additionally.

* If the terminal server does not have a USB port, please prepare a device server separately.

Price List

FLEXSCHE GP	3,200,000 JPY *1
Large Data Option	1,600,000 JPY *2
FLEXSCHE GUI Extension	800,000 JPY
FLEXSCHE Editor	400,000 JPY
FLEXSCHE EDIF	600,000 JPY
FLEXSCHE d-MPS	2,000,000 JPY *3
FLEXSCHE Analyzer	600,000 JPY
FLEXSCHE GP Advanced Options	
Max 1 (Up to 1 unit)	200,000 JPY
Max 3 (Up to 3 units)	400,000 JPY
Max 5 (Up to 5 units)	600,000 JPY
Max 7 (Up to 7 units)	800,000 JPY
Max 10 (Up to 10 units)	1,000,000 JPY
Infinite (Unlimited number of units)	1,600,000 JPY
FLEXSCHE Viewer	300,000 JPY
Network license compatible function	300,000 JPY
Terminal services license compatible function	300,000 JPY
FLEXSCHE GP Training 3 lessons	40,000 JPY
FLEXSCHE GP Training 9 lessons	100,000 JPY
Onsite training	Negotiable
FLEXSCHE Communicator Basic	1,200,000 JPY
FLEXSCHE Communicator with Core	1,600,000 JPY *4
FLEXSCHE Communicator with GP	2,800,000 JPY *4
FLEXSCHE Communicator Client	1,600,000 JPY
FLEXSCHE GP Advanced Pack	4,800,000 JPY
FLEXSCHE GP Complete Pack	6,000,000 JPY
FLEXSCHE Communicator Regular Pack	7,800,000 JPY

Standard annual maintenance fee   12% equivalent of product price

* 1 The maximum number of operations that can be handled with FLEXSCHE GP is 250,000 operations.
* 2 By adding the large data option to the FLEXSCHE GP, the limit of the number of operations (* 1) is canceled.
* 3 When purchasing with pack products at the same time it will be 1.6 million JPY.
* 4 Pricing for single projects only. Please contact us for pricing in case of multiple projects.
* Please contact us for quantity discounts.
* All amounts are exclusive of consumption tax

Products Lineup & System Requirement

FLEXSCHE

Outline of Product Lineup

FLEXSCHE GP is a complete production scheduler software package and can be operated as a single unit, but by incorporating the FLEXSCHE GUI Extension, convenient additional functions and higher operability can be obtained. A data maintenance tool that runs on Microsoft Excel is attached to FLEXSCHE GP and it is possible to create CSV format data in a tabular format, but in order to accurately create data without error, high skills and considerable efforts with concentration are required. By incorporating the FLEXSCHE Editor that realizes a graphical data editing environment into FLEXSCHE GP, it is possible to quickly and reliably create all the data necessary for scheduling. FLEXSCHE Editor may also be run on a standalone basis without being incorporated into FLEXSCHE GP. If you already have a database with your core system in your environ- ment and you want to link this information with FLEXSCHE, you can easily set up data linkage between database and FLEXSCHE by using FLEXSCHE EDIF.

As a result of putting together the data model and scheduling rules, you may face problems that you can not solve within the standard functions of FLEXSCHE GP. There is also a way to customize (program) by utilizing the flexibility of FLEXSCHE, but please check each function of the FLEXSCHE GP Advanced Options before this. Even if you do not have the features you want at the moment, please contact us first. If it is a highly generic requirement, it may be possible to offer it at low cost on the premise that it will be commercialized as an advanced option.

There is no need to purchase additional FLEXSCHE GP just for displaying the scheduling result by FLEXSCHE GP on a Gantt chart with a different PC. You can install inexpensive FLEXSCHE Viewer on each PC and read the data from the file server or Web server.
By linking the FLEXSCHE Communicator series and FLEXSCHE GP / FLEXSCHE Viewer, it is possible to construct an advanced scheduling system that is unprecedented - with real-time data exchange, schedule distribution, automatic scheduling, and operation by multiple persons in charge.

In order to make appropriate planning on the production scheduler, it is necessary to clarify what, how many and by when to make it, but in the make-to-stock production where the demand itself fluctuates uncertainly in the first place, this is often difficult. It is FLEXSCHE d-MPS that exerts its power in such a situation. We can monitor changes in supply and demand balance, foresee future excess and deficiency, and accurately adjust request amounts to the factory while confirming feasibility by simulation.

The role of the production scheduler is not just planning. The production scheduler can be said to be a highly modeled virtual factory, and the various data accumulated there is definitely "a mountain of treasure". By analyzing various indicators extracted from it in a diverse manner, we can obtain valuable information for the manufacturing industry. This is useful not only for planning tasks but also for making business decisions. The mechanism that provides the means for that is FLEXSCHE Analyzer.

Operating environment of FLEXSCHE

OS	Microsoft Windows 10 / 10 x64 / 8 / 8 x64 / 7 / 7 x64 / Vista / Vista x64 / Server 2012 R2 / Server 2012 / Server 2008 R2 / Server 2008
	However, Microsoft Internet Explorer 9 or later must be installed
CPU	Intel® Pentium® 4 processor family or higher
Memory	1GB or more (2GB or more is recommended) [1]
Free Disk Space	500MB or more
Monitor Resolution	1024×768 or better (High resolution of 2K or more, Multi-monitor is ideal)
Supported Languages	Japanese, English, Korean and Chinese (Simplified and Traditional) [2]
Other	Requires a USB Port (for license key) and Mouse with scroll wheel

Operating environment of FLEXSCHE Communicator

OS	Server 2012 R2 / Server 2012 / Server 2008 R2 / Server 2008
CPU	Intel® Pentium® 4 processor family or higher
Memory	4GB or more [1]
Free Disk Space	200MB or more [1]
Supported Languages	Japanese [2]
Other	Requires a USB Port (for license key)

[1] Operating conditions differ depending on the data that is managed and run.
The upper limit of memory space is 2 GB or 3 GB for 32 bit OS and 8 TB for 64 bit version FLEXSCHE.
[2] The languages supported by FLEXSCHE will be added gradually, so please inquire.

Information for Developers

Extensibility by Programming

FLEXSCHE GP is developed based on the production scheduling platform FLEXSCHE Components. FLEXSCHE Components offers a variety of functions necessary for the production scheduler. Because low level complex processing is encapsulated, developers can focus on high level design and implementation. In addition, the interface of the FLEXSCHE Components is fully disclosed, and third parties can also develop their own production scheduler.

FLEXSCHE GP can expand indefinitely and efficiently.

FLEXSCHE Components

FLEXSCHE Components is a set of software components for freely building a production scheduling system. Typical modules include:

◆**FLEXSCHE Core** that implements a generic production scheduling object model

◆**FLEXSCHE GUI** for visualizing and manipulating it interactively

These are compliant with the COM interface which is the specification of the Microsoft Windows programming interface. Detailed online manuals for developers are available.

◆Add-In

This is a program that freely extends the function of FLEXSCHE. For example, you can add a unique user interface, access various objects in FLEXSCHE in the interface, change the assignment state of operations, and so on.

Some functions of the optional product FLEXSCHE GUI extension and FLEXSCHE Editor etc. are also implemented as add-ins. It can be developed in any programming language conforming to the COM interface, such as VBScript, JScript, Visual C ++, Visual Basic, C # and other .NET-compatible languages.

◆Rich Scripting Environment

By using the FLEXSCHE script template generation tool, you can easily develop add-ins with VBScript and JScript with just a text editor. Also, by using FLEXSCHE Scripting Form (FSF), you can create sophisticated dialogs, custom views, and custom panels with scripts only.
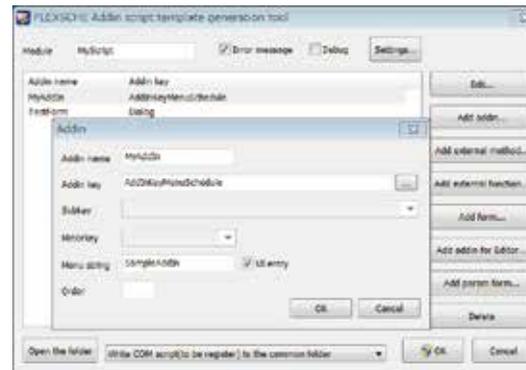
◆External Methods / External Functions

You can implement complex and special behavior of scheduling and calculation expressions as fast external programs.

◆Ensemble Module

It is a module that implements functions that characterize production schedules such as "data input / output", "scheduling", "user interface extension". It is developed using FLEXSCHE Components. In FLEXSCHE GP, those functions are implemented in the module called "GP Ensemble".
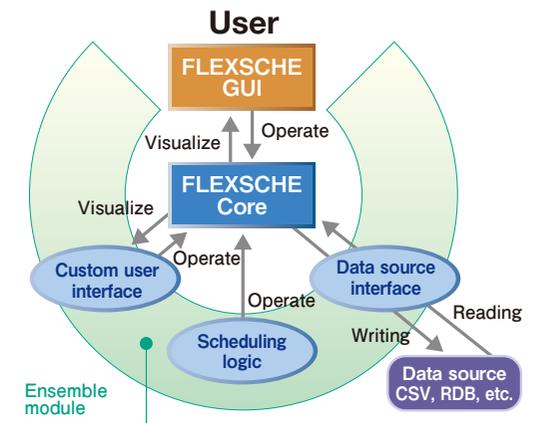
FLEXSCHE constantly pursues the best performance

High performance is one of the most important tasks in the development of a production scheduler that is required to read, display, operate, and repeatedly reschedule vast amounts of data.

Most of FLEXSCHE is being developed in C ++ to pursue maximum processing speed and memory efficiency. We are continuing to improve our data structure and algorithms for best performance, not only for scheduling processing, but also for drawing processing, user interface response, data source reading and writing, etc. As a result, light operability and operational efficiency are realized, so even large amounts of data with several millions of operations can be handled efficiently and practically.

Reasons to Choose FLEXSCHE — Developer's Particularities

FLEXSCHE products started with FLEXSCHE Components, which were developed as "a platform for building a production scheduling system." This was a software package developed as an additional scheduling solution to resolve the dilemma of software packages that only incorporated standard functions not being able to meet the diverse demands of the manufacturing industry, but also with the knowledge that there were too many technical and economic barriers to making completely customized solutions.

Traditional production scheduling software packages have the advantage of being equipped with a wealth of functions and offering installation at a comparatively low cost, but in over twenty years of experience in developing production schedulers, we realized that the existing software package approach of simply adding standard functions and expanding the applicable range was questionable. It was clear that it was impossible to really resolve the concerns facing all the production sites. FLEXSCHE Components was introduced into the market to resolve these issues, and was well received by the market. In particular, the system integrators and manufacturing scheduling operators, with experience installing and operating existing production schedulers, identified with and highly praised this concept and solution.

FLEXSCHE Components did achieve the objectives of building a high-level production scheduling system at a far less cost than custom-made products, and with a high level of know-how. However, the weak point of FLEXSCHE Components was that it was based on the premise of always requiring professional integration. The threshold was still somewhat high for end users themselves to install the product.

Consequently, we decided to develop a general-purpose software package based on FLEXSCHE Components. This new software had to be a complete software package on a general-use level that was loaded with the diverse production scheduling know-how and technologies we had accumulated, and had to allow for a greater extent of flexible arrangement and modeling within the range of standard functions than existing schedulers. FLEXSCHE GP is the result.

In the development of FLEXSCHE GP, the main condition was that it had to be a success while having and exceeding the characteristics of FLEXSCHE Components that truly differentiated it from other schedulers. This characteristic is that "programming will handle any special requirement." This condition has been met.

The existence and indispensability of "special requirements" is not always apparent when deciding to install the software. The fact that there are special requirements is not often recognized until after investing a significant amount of money. But choosing FLEXSCHE GP, which definitely provides security in managing special requirements when they occur, greatly lowers the risks and concerns when building a new system.

It is comparatively easy to resolve each issue when it occurs. However, that is not desirable from the perspective of system growth. Such an approach will eventually lead to a patch-work system and become bloated. Consequently, we are always striving to find the common denominators lying at the bottom of these issues and then incorporating them as very primitive and abstract models and functions.

When we encounter another problem later, we have repeatedly found that it is possible to resolve these by combining the accumulated primitive models and functions, even when it is a new problem that we have not encountered before. In other words, we are confident that what gives FLEXSCHE products flexibility is that they are richly equipped with this flexible" vocabulary" (≠ functions).

After resolving one problem, we receive ever difficult requests. Repeating this process refines FLEXSCHE products and enables them to grow. There is a profound depth to production scheduling technologies, and these provide us with continual challenges. However, our motivation as engineers is also stimulated by overcoming these challenges.

Since our company is small, it is impossible for us to install FLEXSCHE products in many factories by ourselves. However, we face our daily tasks with the desire to strongly support the manufacturing industry around the world through partnerships with global solution providers. FLEXSCHE GP and other FLEXSCHE products will continue to grow to meet your ever-increasing expectations.

Mikio Urano
President & Chief Executive Officer
FLEXSCHE Corporation

※**GP** stands for **G**eneral **P**urpose.

FLEXSCHE Corporation

Email : en-sales-contact@flexsche.com

https://www.flexsche.com/en

2016.12