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Term
Backflush

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Term
Balancing operations

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Term
Bottleneck

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Term
Buffer

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Term
Buffer management

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Term
By-product

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Term
Capacity-constrained resource (CCR)

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Term
Co-product

In repetitive just-in-time production, matching actual output cycle times of all operations to the demand or use for parts as required by final assembly and, eventually, as required by the market.

A method of inventory bookkeeping where the book (computer) inventory of components is automatically reduced by the computer after completion of activity on the component's upper-level parent item based on what should have been used as specified on the bill of material and allocation records. This approach has the disadvantage of a built-in differential between the book record and what is physically in stock. Syn.: explode-to-deduct, post-deduct inventory transaction processing. See: pre-deduct inventory transaction processing.

In theory of constraints, time or material that supports throughput and/or due date performance.

A facility, function, department, or resource whose capacity is less than the demand placed upon it. For example, [this type of] machine or work center exists where jobs are processed at a slower rate than they are demanded. Syn.: bottleneck operation.

A material of value produced as a residual of or incidental to the production process. The ratio of [this] to primary product is usually predictable. [These] may be recycled, sold as-is, or used for other purposes. See: co-product.

In the theory of constraints, a process in which all expediting in a shop is driven by what is scheduled to be in the buffers (constraint, shipping, and assembly buffers). By expediting this material into the buffers, the system helps avoid idleness at the constraint and missed customer due dates. In addition, the reasons items are missing from the buffer are identified, and the frequency of occurrence is used to prioritize improvement activities.

A product that is usually manufactured together or sequentially because of product or process similarities. See: by-product.

A resource that is not a constraint but will become a constraint unless scheduled carefully. Any resource that, if its capacity is not carefully managed, is likely to compromise the throughput of the organization.

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Constraint

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Term
Constraints management

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Term
Control points

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Term
Corrective action

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Term
Count point

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Term
Cycle time

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Term
Delivery schedule

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Term
Divergent point

The practice of managing resources and organizations in accordance with the theory of constraints (TOC) principles. See: theory of constraints.

Any element or factor that prevents a system from achieving a higher level of performance with respect to its goal.

The implementation of solutions resulting in the reduction or elimination of an identified problem.

In the theory of constraints, strategic locations in the logical product structure for a product or family that simplify the planning, scheduling, and control functions. [These] include gating operations, convergent points, divergent points, constraints, and shipping points. Detailed scheduling instructions are planned, implemented, and monitored at these locations. Other work centers are instructed to “work if they have work; otherwise, be prepared for work.” In this manner, materials flow rapidly through the facility without detailed work center scheduling and control.

1) In industrial engineering, the time between the completion of two discrete units of production. For example, [if] motors [are] assembled at a rate of 120 per hour, [this] is 30 seconds. 2) In materials management, the length of time from when material enters a production facility until it exits. Syn.: throughput time.

A point in a flow of material or sequence of operations at which parts, subassemblies, or assemblies are counted as being complete. [These] may be designated at the ends of lines or upon removal from a work center, but most often they are designated as the points at which material transfers from one department to another. Syn.: pay point.

An operation in a production process in which a single material/component enters and, after processing, can then be routed to a number of different downstream operations.

The required or agreed time or rate of delivery of goods or services purchased for a future period.

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Term
Drum

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Term
Drum schedule

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Term
Drum-buffer-rope (DBR)

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Term
Earned hours

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Term
Excess capacity

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Term
Feedback

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Term
Feeder workstations

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Term
Flexible workforce

The detailed production schedule for a resource that sets the pace for the entire system. [It] must reconcile the customer requirements with the system's constraint(s).

In the theory of constraints, the constraint is viewed as a drum, and nonconstraints are like soldiers in an army who march in unison to the drumbeat; the resources in a plant should perform in unison with the drumbeat set by the constraint.

A statement reflecting the standard hours assigned for actual production reported during the period. Syn.: earned volume.

The theory of constraints method for scheduling and managing operations that have an internal constraint or capacity-constrained resource.

The flow of information back into the control system so that actual performance can be compared with planned performance.

Capacity that is not used to either produce or protect the creation of throughput.

A workforce whose members are cross-trained and whose work rules permit assignment of individual workers to different tasks.

An area of manufacture whose products feed a subsequent work area.

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Term
Floor stocks

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Term
Flow control

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Term
Flow shop

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Term
Forward flow scheduling

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Term
Heijunka

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Term
Inbound stockpoint

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Term
Input/output control (I/O control)

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Term
Intermittent production

A specific production control system that is based primarily on setting production rates and feeding work into production to meet these planned rates, then monitoring and controlling production. See: shop floor control.

Stocks of inexpensive production parts held in the factory, from which production workers can draw without requisitions. Syn.: bench stocks, expensed stocks.

A procedure for building process train schedules that starts with the first stage and proceeds sequentially through the process structure until the last stage is scheduled.

A form of manufacturing organization in which machines and operators handle a standard, usually uninterrupted, material flow. The operators generally perform the same operations for each production run. [This] is often referred to as a mass production shop or is said to have a continuous manufacturing layout. The plant layout (arrangement of machines, benches, assembly lines, etc.) is designed to facilitate a product "flow." Some process industries (chemicals, oil, paint, etc.) are extreme examples of [this]. Each product, though variable in material specifications, uses the same flow pattern through the shop. Production is set at a given rate, and the products are generally manufactured in bulk. Syn.: flow line, flow manufacturing, flow plant.

A defined location next to the place of use on a production floor. Materials are brought to [it] as needed and taken from it for immediate use. [These] are used with a pull system of material control.

In just-in-time philosophy, an approach to level production throughout the supply chain to match the planned rate of end product sales.

A form of manufacturing in which the jobs pass through the functional departments in lots, and each lot may have a different routing. See: job shop.

A technique for capacity control where planned and actual inputs and planned and actual outputs of a work center are monitored. Planned inputs and outputs for each work center are developed by capacity requirements planning and approved by manufacturing management. Actual input is compared to planned input to identify when work center output might vary from the plan because work is not available at the work center. Actual output is also compared to planned output to identify problems within the work center. Syn.: input/output analysis. See: capacity control.

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Term
Kanban

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Term
Labor efficiency

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Term
Lean production

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Term
Line balancing

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Term
Lot sizing

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Term
Lower specification limit (LSL)

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Term
Machine-limited capacity

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Term
Material usage variance

The average of worker efficiency for all direct workers in a department or facility. Syn.: worker efficiency.

A method of just-in-time production that uses standard containers or lot sizes with a single card attached to each. It is a pull system in which work centers signal with a card that they wish to withdraw parts from feeding operations or suppliers. [This] Japanese word, loosely translated, means card, billboard, or sign, but other signaling devices such as colored golf balls have also been used. The term is often used synonymously for the specific scheduling system developed and used by the Toyota Corporation in Japan. See: move card, production card, synchronized production.

1) The balancing of the assignment of the tasks to workstations in a manner that minimizes the number of workstations and minimizes the total amount of idle time at all stations for a given output level. In balancing these tasks, the specified time requirement per unit of product for each task and its sequential relationship with the other tasks must be considered. See: uniform plant loading. 2) A technique for determining the product mix that can be run down an assembly line to provide a fairly consistent flow of work through that assembly line at the planned line rate.

A philosophy of production that emphasizes the minimization of the amount of all the resources (including time) used in the various activities of the enterprise. It involves identifying and eliminating non-value-adding activities in design, production, supply chain management, and dealing with customers. [It also employs] teams of multiskilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in potentially enormous variety. [It] contains a set of principles and practices to reduce cost through the relentless removal of waste and through the simplification of all manufacturing and support processes. Syn.: lean, lean manufacturing.

In statistical process control, charting the line that defines the minimum acceptable level of random output. See: tolerance limits.

The process of, or techniques used in, determining lot size. See: order policy.

The difference between the planned or standard requirements for materials to produce a given item and the actual quantity used for a particular instance of manufacture.

A production environment where a specific machine limits throughput of the process. See: constraint, throughput.

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Term
Material-dominated scheduling (MDS)

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Term
Mixed-flow scheduling

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Term
Mixed-model production

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Term
Mixed-model scheduling

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Term
Move card

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Term
Occurrence factor

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Term
One-card kanban system

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Term
One-piece flow

A procedure used in some process industries for building process train schedules that start at an initial stage and work toward the terminal process stages. This procedure is effective for scheduling where several bottleneck stages may exist. Detailed scheduling is done at each bottleneck stage.

A technique that schedules materials before processors (equipment or capacity). This technique facilitates the efficient use of materials. [It] can be used to schedule each stage in a process flow scheduling system. MRP systems use material-dominated scheduling logic. See: processor-dominated scheduling.

The process of developing one or more schedules to enable mixed-model production. The goal is to achieve a day's production each day. See: mixed-model production.

Making several different parts or products in varying lot sizes so that a factory produces close to the same mix of products that will be sold that day. The mixed-model schedule governs the making and the delivery of component parts, including those provided by outside suppliers. The goal is to build every model every day, according to daily demand.

Within the repair/remanufacturing environment, the occurrence factor is associated with how often a repair is required to bring the average part to a serviceable condition (some repair operations do not occur 100 percent of the time). The factor is expressed at the operation level in the routing. See: repair factor, replacement factor.

In a just-in-time context, a card or other signal indicating that a specific number of units of a particular item are to be taken from a source (usually an outbound stockpoint) and taken to a point of use (usually an inbound stockpoint). It authorizes the movement of one part number between a single pair of work centers. The card circulates between the outbound stockpoint of the supplying work center and the inbound stockpoint of the using work center. Syn.: move signal, conveyance card. See: kanban.

A concept in which items are processed directly from one step to the next, one unit at a time. This helps to shorten lead times and lines of communication, thus more quickly identifying problems.

A kanban system where only a move card is employed. Typically, the work centers are adjacent; therefore, no production card is required. In many cases, squares located between work centers are used as the kanban system. An empty square signals the supplying work center to produce a standard container of the item. Syn.: single-card kanban system. See: two-card kanban system.

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Term
Operation/process yield

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Term
Order release

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Term
Outbound stockpoint

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Term
Overload

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Term
Pacemaker

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Term
Probable scheduling

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Term
Process manufacturing

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Term
Process train

The activity of releasing materials to a production process to support a manufacturing order. See: planned order release.

The ratio of usable output from a process, process stage, or operation to the input quantity, usually expressed as a percentage.

A condition in which the total hours of work outstanding at a work center exceed that work center's capacity.

The designated locations near the point of use on a plant floor to which material produced is taken until it is pulled to the next operation.

A variant of scheduling that considers slack time to increase or decrease the calculated lead time of an order. Interoperation and administrative lead time components are expanded or compressed by a uniform "stretching factor" until no difference exists between the schedule of operations obtained by forward and backward scheduling. See: lead time scheduling.

In lean, the resource that is scheduled based on the customer demand rate for that specific value stream; this resource performs an operation or process that governs the flow of materials along the value stream. Its purpose is to maintain a smooth flow through the manufacturing plant. A larger buffer is provided for [this than for] other resources so that it can maintain continuous operation. See: constraint.

A representation of the flow of materials through a process industry manufacturing system that shows equipment and inventories. Equipment that performs a basic manufacturing step, such as mixing or packaging, is called a process unit. Process units are combined into stages, and stages are combined [to form these]. Inventories decouple the scheduling of sequential stages within [this].

Production that adds value by mixing, separating, forming, and/or performing chemical reactions. It may be done in either batch or continuous mode. See: project manufacturing.

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Term
Processor-dominated scheduling

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Term
Production card

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Term
Production leveling

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Term
Production reporting and status control

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Term
Pull signal

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Term
Resource-limited scheduling

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Term
Reverse flow scheduling

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Term
Rope

In a just-in-time context, a card or other signal for indicating that items should be made for use or that some items removed from pipeline stock should be replaced. See: kanban.

A technique that schedules equipment (processor) before materials. Facilitates scheduling equipment in economic run lengths and the use of low-cost production sequences. A scheduling method used in some process industries. See: material-dominated scheduling.

A vehicle to provide feedback to the production schedule and allow for corrective action and maintenance of valid on-hand and on-order balances. Normally includes manufacturing order authorization, release, acceptance, operation start, delay reporting, move reporting, scrap and rework reporting, order close-out, and payroll interface. Syn.: manufacturing order reporting, shop order reporting.

A production planning method that maintains a stable production rate while varying inventory levels to meet demand.

The scheduling of activities so that predetermined resource availability pools are not exceeded. Activities are started as soon as resources are available (with respect to logical constraints), as required by the activity. When not enough of a resource exists to accommodate all activities scheduled on a given day, a priority decision is made. Project finish may be delayed, if necessary, to alter schedules constrained by resource usage.

Any signal that indicates when to produce or transport items in a pull replenishment system. For example, in just-in-time production control systems, a kanban card is used as [this] to replenish parts to the using operation. See: pull system.

One of the three devices required for proper management of operations. (The other two are drum and buffer.) The rope is the information flow from the drum to the front of the line (material release), which chokes the release of materials to match the flow through the constraint.

A scheduling procedure used in some process industries for building process train schedules. Starts with the last stage and proceeds backward (countercurrent to the process flow) through the process structure.

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Term
Specification

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Term
Split lot

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Term
Standardized work

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Term
Store

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Term
Takt time

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Term
Theory of constraints (TOC)

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Term
Time buffer

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Term
Tolerance

A manufacturing order quantity that has been divided into two or more smaller quantities, usually after the order has been released. The quantities of [this] may be worked on in parallel, or a portion of the original quantity may be sent ahead to a subsequent operation to be worked on while work on the remainder of the quantity is being completed at the current operation. The [purpose...] is to reduce the lead time of the order.

A clear, complete, and accurate statement of the technical requirements of a material, an item, or a service, and of the procedure to determine if the requirements are met.

A storage point located upstream of a work station, intended to make it easier to see customer requirements.

A work process that is always carried out exactly the same way, preferably using the current best known way under which the output can be achieved.

A holistic management philosophy developed by Dr. Eliyahu M. Goldratt, based on the principle that complex systems exhibit inherent simplicity. Even a very complex system comprising thousands of people and pieces of equipment can have, at any given time, only a very, very small number of variables—perhaps only one, known as a constraint—that actually limit the ability to generate more of the system's goal.

Sets the pace of production to match the rate of customer demand and becomes the heartbeat of any lean production system. Computed as the available production time divided by the rate of customer demand. For example, assume demand is 10,000 units per month, or 500 units per day, and planned available capacity is 420 minutes per day. [This] = 420 minutes per day ÷ 500 units per day = 0.84 minutes per unit. [This... means] that a unit should be planned to exit the production system on average every 0.84 minutes. Syn.: tact time.

Allowable departure from a nominal value established by design engineers that is deemed acceptable for the functioning of the good or service over its life cycle.

Protection against uncertainty that takes the form of time.

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Term
Tolerance limits

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Term
Transfer batch

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Term
Two-card kanban system

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Term
Unplanned repair

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Term
Upper specification limit (USL)

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Term
VATI analysis

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Term
Visual control

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Term
Waste exchange

The quantity of an item moved between sequential work centers during production. See: batch, overlap quantity.

1) The upper and lower extreme values permitted by the tolerance. 2) In work measurement, the limits between which a specified operation time value or other work unit will be expected to vary. See: lower specification limit, upper specification limit. Syn.: specification limits.

Repair and replacement requirements that are unknown until remanufacturing teardown and inspection.

A kanban system where a move card and production card are employed. The move card authorizes the movement of a specific number of parts from a source to a point of use. The move card is attached to the standard container of parts during movement of the parts to the point of use. The production card authorizes the production of a given number of parts for use or replenishment. Syn.: dual-card kanban system. See: one-card kanban system.

In the theory of constraints, a procedure for determining the general flow of parts and products from raw materials to finished products (logical product structure). [The "V"] logical structure starts with one or a few raw materials, and the product expands into a number of different products as it flows through divergent points in its routings. The shape of an ["A"] logical structure is dominated by converging points. Many raw materials are fabricated and assembled into a few finished products. [The "T"] logical structure consists of numerous similar finished products assembled from common assemblies, subassemblies, and parts. An ["I"] logical structure is the simplest of production flows, where resources are shared between different products and the flow is in a straight line sequence (e.g., an assembly line). Once the general parts flow is determined, the system control points (gating operations, convergent points, divergent points, constraints, and shipping points) can be identified and managed.

In statistical process control, the line that defines the maximum acceptable level of random output. See: tolerance limits.

1) Arrangement in which companies exchange their wastes for the benefit of both parties. 2) An exchange service of valuable information between generators and potential users of industrial and commercial wastes, whereby a beneficial use rather than disposal is the end result. This service identifies both the producers and potential markets for by-products, surpluses, unspent materials, and other forms of solid waste that is no longer needed.

The control of authorized levels of activities and inventories in a way that is instantly and visibly obvious. A type of activity and inventory control used in a workplace organization where everything has an assigned place and is in its place.