

## A3 Report

A Toyota-pioneered practice of getting the problem, the analysis, the corrective actions, and the action plan down on a single sheet of large (A3) paper, often with the use of graphics. At Toyota, A3 reports have evolved into a standard method for summarizing problem-solving exercises, status reports, and planning exercises like value-stream mapping.

A3 paper is the international term for paper 297 millimeters wide and 420 millimeters long. The closest U.S. paper size is the 11-by-17 inch tabloid sheet.

See: Value-Stream Mapping (VSM).

### APEX TUBE COMPANY—Continuous Flow Project

Truck Fuel-Line Pacemaker Cell

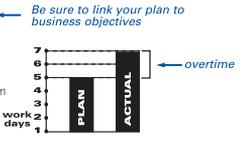
#### 1) Background/Business Case

*Be sure to link your plan to business objectives*

**Product** – S/L/A Fuel Lines  
**Location** – Anytown

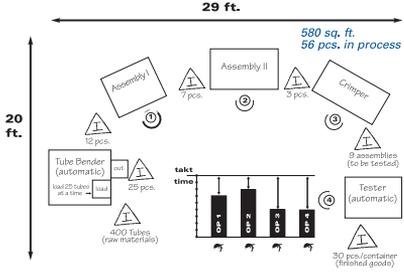
**Needs:**

- Customer requires 5% cost reduction
- Improve productivity

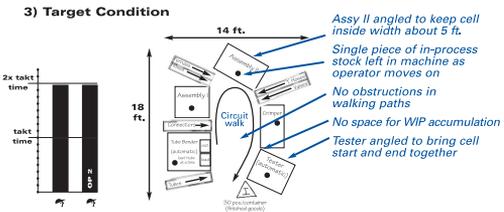


#### 2) Initial condition

- No continuous material flow
- No people flow (operators stay at one machine)
- Unstable output
- Too much overtime
- Not working to takt time
- Too many operators for demand rate



#### 3) Target Condition



#### 4) Implementation

#	Task	Meck	Responsible person	Target date	March '04	April '04	May '04	June	Review	Review
1	Introduction Training				○					○
2	Mock Up/Trial				○					○
3	Add Auto Eject				○	△				△
4	Reconfigure Cell				○	△				○
5	Std. Work Training				○	△				○
6	Train Material Handlers				○	△				△
7	Cell Debugging				○	△				○
8	Final Check Goods Supermarket				○	△				○
9	Production Kanban				○	△				○
10	Frequent Withdrawal				○	△				△
11	Heijunka Box				○	△				○

○ Proposed Start    △ Proposed Completion    ○ On Target    × Trouble  
● Actual Start    ▲ Actual Completion    ◊ Behind Target  
(Planning/Tracking)    (Evaluation)

#### 5) Indicators

	Pcs. per Hour	WIP	Space	Cost per Unit
<b>Current</b>	20	56 pcs.	580 ft. <sup>2</sup>	\$8.27
<b>Goal</b>	40	5 pcs.	252 ft. <sup>2</sup>	\$7.27

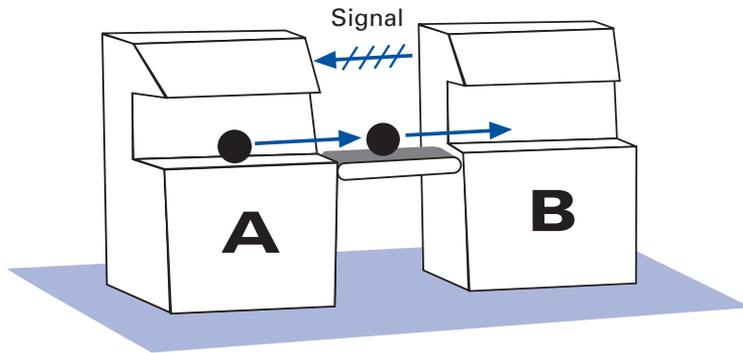
*Be sure to include goals so level of success can be evaluated.*

### A-B Control

A way to regulate the working relationships between two machines or operations to control overproduction and ensure balanced use of resources.

In the Illustration, neither of the machines nor the conveyor will cycle unless three conditions are met: Machine A is full, the conveyor contains the standard amount of work-in-process (in this case, one piece), and Machine B is empty. When those conditions are met, all three will cycle once and wait until the conditions are met again.

See: Inventory, Overproduction.



### ABC Production Analysis

Segmenting part numbers into groups based on demand. Lean thinkers use this analysis to decide how much and for which products to hold inventory. A items are high runners, B items are medium runners, and C items are low runners. C items typically include infrequent color and build combinations, special-edition items, and replacement parts.

See: Flow Production, Pull Production.

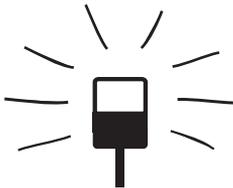
## Andon

A visual management tool that highlights the status of operations in an area at a single glance and that signals whenever an abnormality occurs.

An andon can indicate production status (for example, which machines are operating), an abnormality (for example, machine downtime, a quality problem, tooling faults, operator delays, and materials shortages), and needed actions, such as changeovers. An andon also can be used to display the status of production in terms of the number of units planned versus actual output.

A typical andon, which is the Japanese term for “lamp,” is an overhead signboard with rows of numbers corresponding to work- stations or machines. A number lights when a problem is detected by a machine sensor, which automatically trips the appropriate light, or by an operator who pulls a cord or pushes a button. The illuminated number summons a quick response from the team leader. Colored lighting on top of machines to signal problems (red) or normal operations (green) is another type of andon.

See: Jidoka, Visual Management.



Simple andon.

Product A	1	2	3	4
Product B	1	2	3	4
Planned Production		Actual Production		
110		98		

Complex andon.

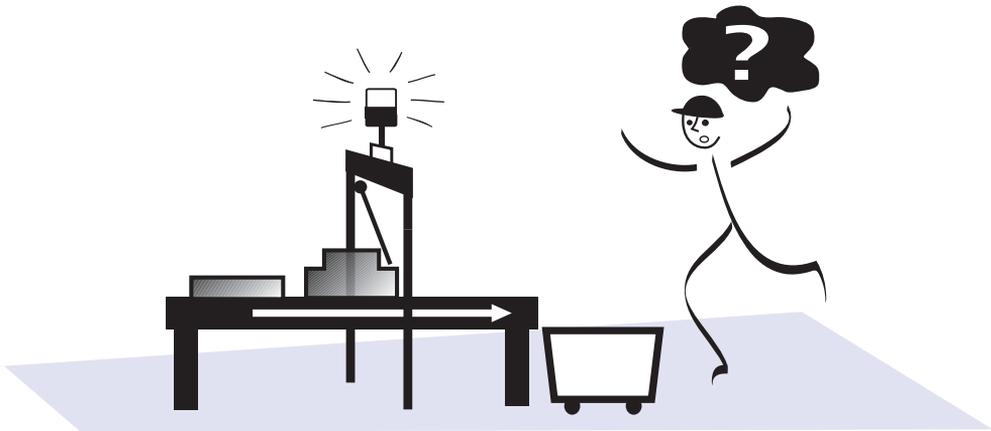
## Automatic Line Stop

Ensuring that a production process stops whenever a problem or defect occurs.

For an automated line this usually involves the installation of sensors and switches that automatically stop the line when an abnormality is detected. For a manual line a fixed-position stop system often is installed. This permits operators to pull an overhead cord or push a button that stops the process at the end of a work cycle if the problem encountered cannot be fixed during the cycle.

These examples illustrate the lean principle of jidoka, which prevents defects from going to the next phase of production and avoids the waste of making a series of defective items. Mass producers, by contrast, will try to keep lines running to achieve high equipment utilization, even when known defects occur repetitively and require rework at the end of the process.

See: Error-Proofing, Fixed-Position Stop System, Jidoka.



Automatic line stop.

## Autonomation

See: Jidoka.

## Basic Stability

Having essential capability, availability, and flexibility in the 4Ms —manpower, machines, materials, and methods. A lack of basic stability in a process prevents improvements from either occurring or being sustained.

A process with basic stability is capable (able to reliably produce good parts but short of jidoka at each step), available (can produce when needed and at a pace with takt time), and flexible (able to change over a few items but short of every-part-every-interval (EPEX)).

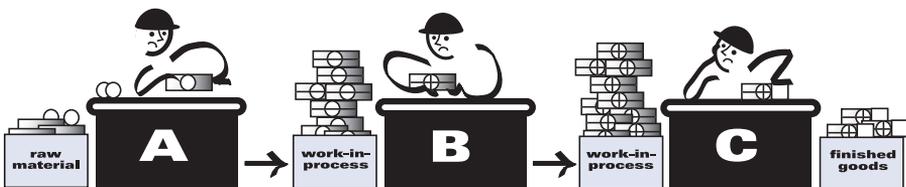
Basic stability is required for the effective functioning of just-in-time (JIT) production, which often follows an implementation cycle of basic stability—flow—takt time—pull—heijunka. The cycle is repeated over and over as needed.

*See:* EPEX, Heijunka; Jidoka, Just-in-Time; Muda, Mura, Muri; Total Productive Maintenance

## Batch-and-Queue

A mass production approach to operations in which large lots (batches) of items are processed and moved to the next process —regardless of whether they are actually needed—where they wait in a line (a queue).

*See:* Continuous Flow, Lean Production, Overproduction, Push Production.



Batch-and-queue production.

## Brownfield

An existing production facility, usually managed in accordance with mass production thinking.

*Compare:* Greenfield.