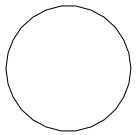
# Process Flow Charts

# 5 Possible Steps:

- **Operation**

Physical change to Products

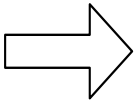
Value Added



- **Transportation**

Object is moved

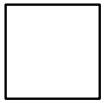
Non Value Added



- **Inspection**

Inspect/Test

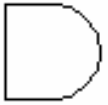
Non Value Added



- **Delay**

Unplanned stop of work (Progress)

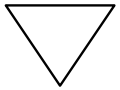
Non Value Added



- **Storage**

Held by design plan

Non Value Added



# Goals – Improve Process by:

- Reduce number of steps
- Rearrange steps
- Reduce cost of individual steps
- Reduce handling
- Combine steps
- Shorten moves
- Make moves cheaper
- Reduce in process inventory

# Questions in Analyzing Flow Charts (1)

- Can any step be eliminated?
  - As unnecessary (Ask: Why is it done?)
  - By new equipment. (Ask: Why is present equipment used?)
  - By changing the place where it is done or kept (Ask: Why is it done there?)
  - By changing the order of work (Ask: why is it done in its present order?)
  - By changing the product design (Ask: why is it made as it is)
  - By changing the specifications of the incoming supply. (Ask: Why is it ordered in its present form or used at all?)

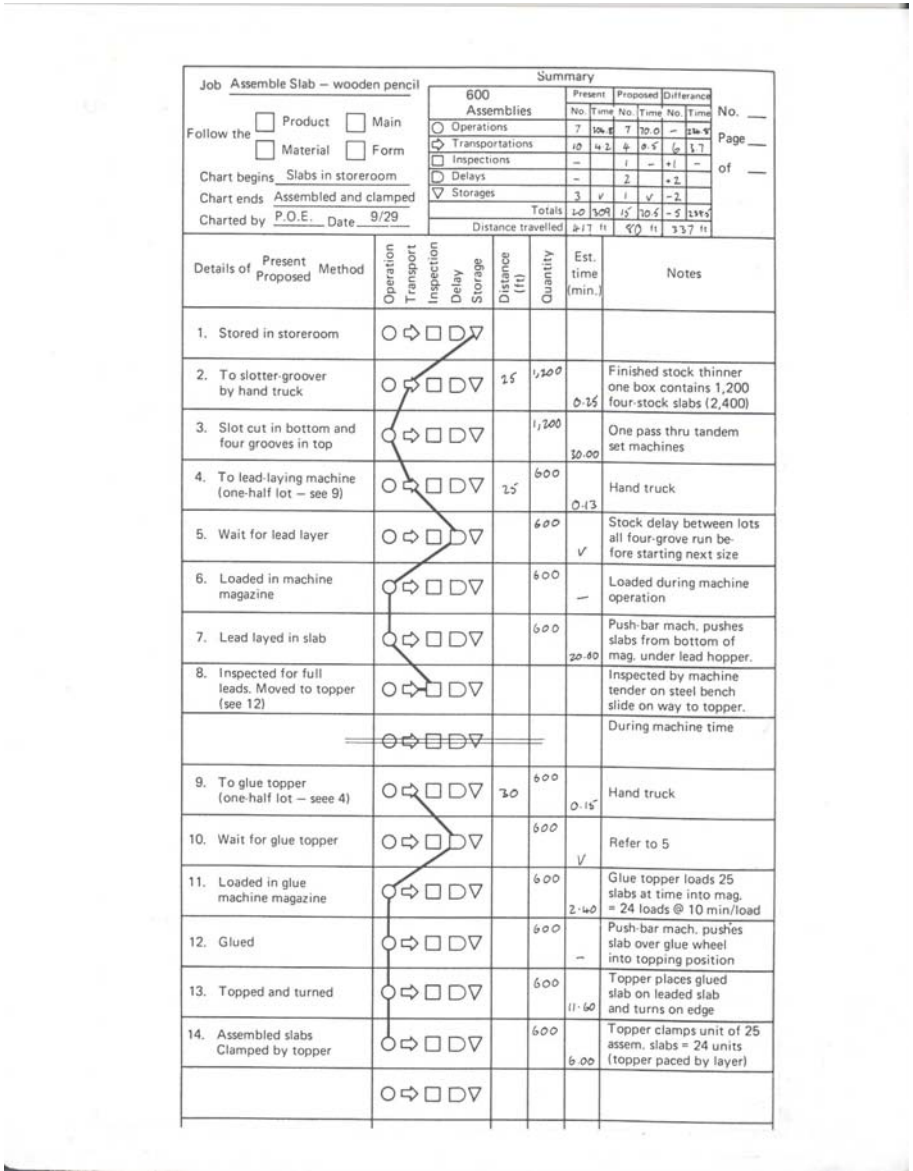
# Questions in Analyzing Flow Charts (2)

- Can any step be combined with another?
  - By changing the specification of supplies or raw materials?
  - By changing the design of the product, even if only the tolerances?
  - By changing the order of the steps of production or doing inspection at any operational station so as to avoid an inventory of faulty products?
  - By changing the equipment used(e.g., using a multifunction machine or creating a multi-machine work cell served by a single person or by a robot)?

# Questions in Analyzing Flow Charts (3)

- Can the steps be rearranged so as to make any shorter or easier ?
- Can any step be made easier? (If this looks like a possibility, make further detailed analysis of this step.)

# Sample Process Flow Chart



Job: Assemble Slab – wooden pencil

Follow the: ☐ Product ☐ Main ☐ Material ☐ Form

Chart begins: Slabs in storeroom

Chart ends: Assembled and clamped

Charted by: P.O.E. Date: 9/29

Summary — 600 Assemblies

| | Present No. | Present Time | Proposed No. | Proposed Time | Difference No. | Difference Time |
|---|---|---|---|---|---|---|
| ○ Operations | 7 | 104.8 | 7 | 70.0 | – | -34.8 |
| ⇨ Transportations | 10 | 42. | 4 | 8.5 | -6 | -33.7 |
| ☐ Inspections | – | | 1 | – | +1 | – |
| D Delays | – | | 2 | | +2 | |
| ▽ Storages | 3 | V | 1 | V | -2 | |
| Totals | 20 | 309 | 15 | 70.5 | -5 | -238.5 |
| Distance travelled | 617 ft | | 80 ft | | 337 ft | |

No. ___ Page ___ of ___

| Details of Present / Proposed Method | Operation | Transport | Inspection | Delay | Storage | Distance (ft) | Quantity | Est. time (min.) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1. Stored in storeroom | ○ | ⇨ | ☐ | D | ▽ | | | | |
| 2. To slotter-groover by hand truck | ○ | ⇨ | ☐ | D | ▽ | 25 | 1,200 | 0.35 | Finished stock thinner one box contains 1,200 four-stock slabs (2,400) |
| 3. Slot cut in bottom and four grooves in top | ○ | ⇨ | ☐ | D | ▽ | | 1,200 | 30.00 | One pass thru tandem set machines |
| 4. To lead-laying machine (one-half lot – see 9) | ○ | ⇨ | ☐ | D | ▽ | 25 | 600 | 0.13 | Hand truck |
| 5. Wait for lead layer | ○ | ⇨ | ☐ | D | ▽ | | 600 | V | Stock delay between lots all four-grove run before starting next size |
| 6. Loaded in machine magazine | ○ | ⇨ | ☐ | D | ▽ | | 600 | – | Loaded during machine operation |
| 7. Lead layed in slab | ○ | ⇨ | ☐ | D | ▽ | | 600 | 20.80 | Push-bar mach. pushes slabs from bottom of mag. under lead hopper. |
| 8. Inspected for full leads. Moved to topper (see 12) | ○ | ⇨ | ☐ | D | ▽ | | | | Inspected by machine tender on steel bench slide on way to topper. |
| | ○ | ⇨ | ☐ | D | ▽ | | | | During machine time |
| 9. To glue topper (one-half lot – seee 4) | ○ | ⇨ | ☐ | D | ▽ | 30 | 600 | 0.15 | Hand truck |
| 10. Wait for glue topper | ○ | ⇨ | ☐ | D | ▽ | | 600 | V | Refer to 5 |
| 11. Loaded in glue machine magazine | ○ | ⇨ | ☐ | D | ▽ | | 600 | 2.40 | Glue topper loads 25 slabs at time into mag. = 24 loads @ 10 min/load |
| 12. Glued | ○ | ⇨ | ☐ | D | ▽ | | 600 | – | Push-bar mach. pushes slab over glue wheel into topping position |
| 13. Topped and turned | ○ | ⇨ | ☐ | D | ▽ | | 600 | 11.60 | Topper places glued slab on leaded slab and turns on edge |
| 14. Assembled slabs Clamped by topper | ○ | ⇨ | ☐ | D | ▽ | | 600 | 6.00 | Topper clamps unit of 25 assem. slabs = 24 units (topper paced by layer) |
| | ○ | ⇨ | ☐ | D | ▽ | | | | |