

Forms & Activities used on ISE - type Projects

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List of Main Forms/Activities

- **Project Profile & Schedule**
- **Tours**
- **Observations**
- **Time Studies**
- **Informational Interviews**
- **Plus/Minus chart**
- **Process Flow chart**
- **Cause/Effect diagram**
- **Defect locator (Measles) chart**
- **Precedence chart & Critical Path**
- **Data Analysis**
- **Pareto (80/20) chart**
- **5-Whys diagram**
- **Facility layout drawing**
- **From/To chart**
- **Activity Relationship chart**
- **Space Utilization chart**
- **5S Score chart**
- **Spaghetti chart (foot path/distance)**
- **Value Stream map**
- **Ergo Risk analysis chart**
- **Benchmarking**
- **FMEA (Failure Mode & Effect Analysis) chart**
- **Comparison of Alternatives**
- **Gap-to-Goal chart**
- **Simulation**

Sample Forms

Project Profile

Project Profile

Project #: PE- 0410 Analyst: Steve Snelling

Assignment Title: 747 T.O.C./Critical Chain Pilot Area

Customers: Final Assembly General Supervisor
A/C Bay Supervisor

Date Assigned: 4/1/2004 ECD: 12/10/2004

Description:

To determine if a pilot area for T.O.C. (Critical Chain) is viable for an area in FBJ systems. Then set up and run the pilot area for several airplanes.

Scope:

FBJ Air Conditioning Installation area (~110 jobs).

Expected Benefits:

Determine potential savings by using alternate scheduling methods.
Determine if feasible. If there are measurable savings by this approach.

Statement of Work:

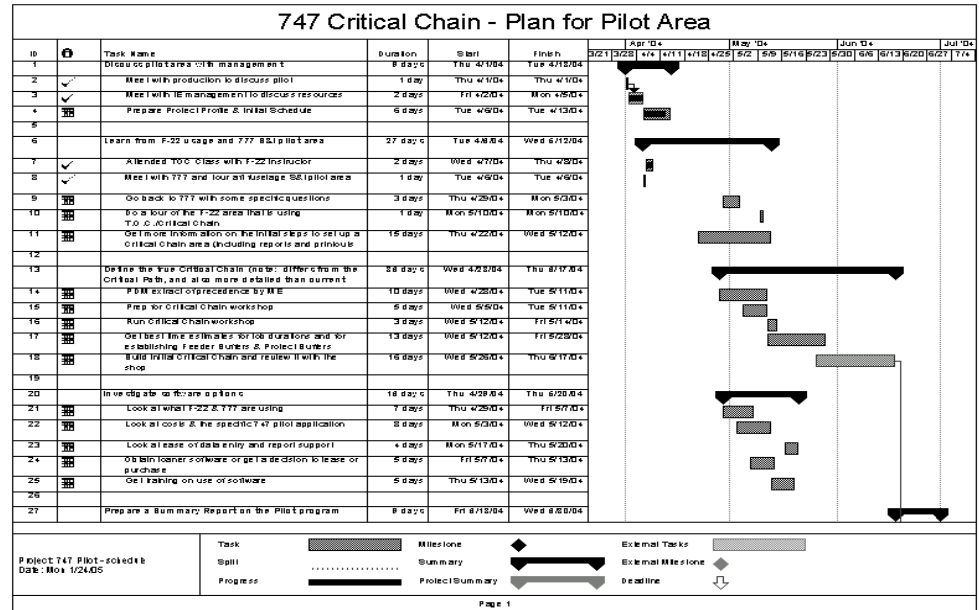
Develop a project plan and schedule
Learn from F-22 usage and 777 S&I pilot area
Define the true Critical Chain (note: differs from the Critical Path, and also more detailed than current P-nets), including revised job times and buffers
Investigate software options
Get IE Resource Commitment
Prepare report on turning on the pilot
Decide to go or no-go
Start up the pilot area

Deliverables:

Detailed precedence networks
Calculated (or estimated) Project Buffer and Feeder Buffers
A detailed Critical Chain network that represents the entire pilot area (all skills)
Sample management reports & tracking charts
A recommendation to proceed or not to proceed with turning on the pilot
A recommendation after running the pilot, to expand or not to expand it to other systems areas in Final Assembly

Schedule: (see attached MS Project schedule)

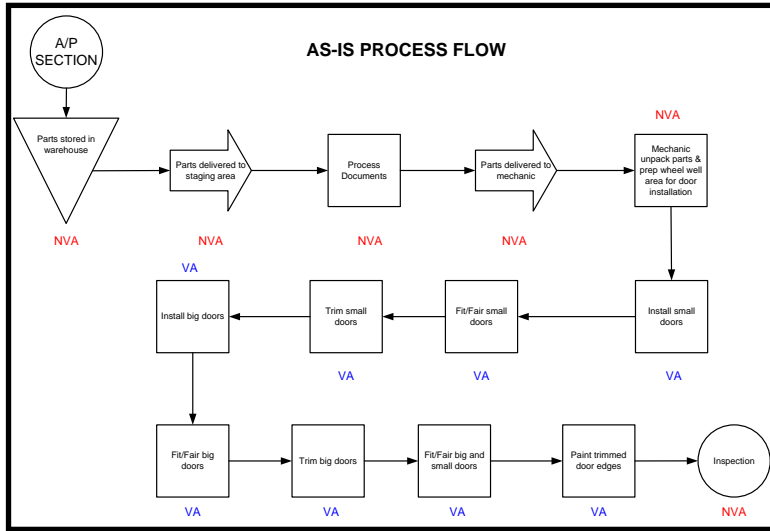
Project Schedule



Sample Forms

Time Study

Process Flow Chart



People/Product Flow Worksheet

Date: _____

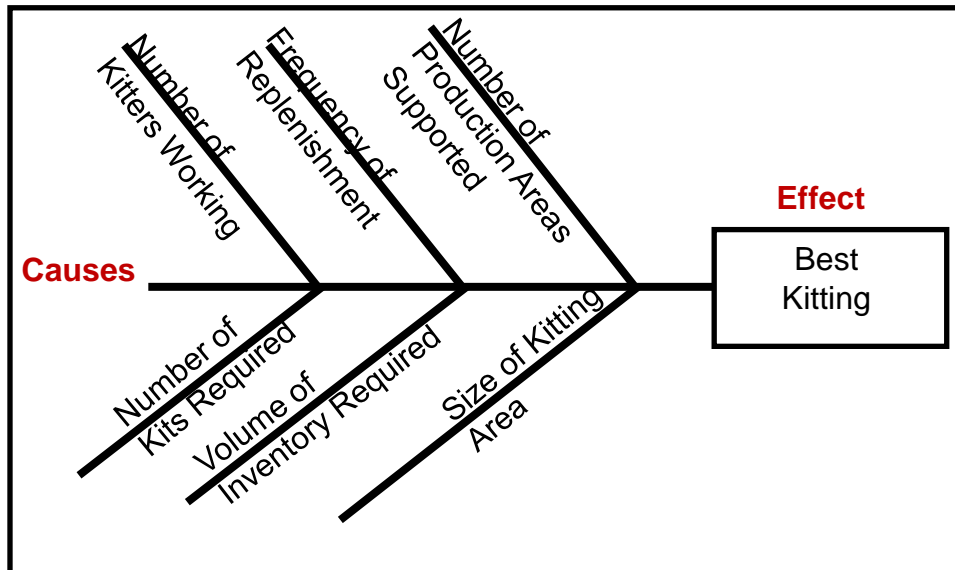
Process Description: _____ Job Number: **IP-000E0XXXX**

Date Taker: _____ Operator: _____

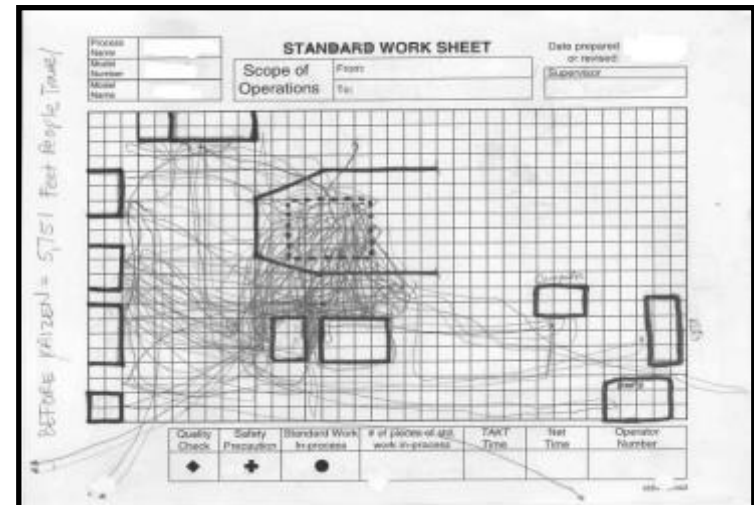
Pace: times this many feet (usually 1 or 3) **3**

Operation Number	Description of the Operation	Hours	Meters	Steps	Total Operations	Steps per Operation	Feet Traveled	Opportunities for Improvement
1	Job sign in		2	9	129	129	40	120
2	go get tool		2	17	137	8	20	60
3	go to A/P		2	29	149	12	5	15
4	clean area		3	4	184	35		0
5	talk		3	19	199	15		0
6	go get tool		3	28	208	9	10	30
7	open crate		4	48	288	80		0
8	go get tool		5	3	303	15	10	30
9	unpack first small door		7	35	455	152		0
10	talk		8	5	485	30		0
11	go get tool		8	51	531	46	15	45

Cause & Effect (Fishbone) Diagram

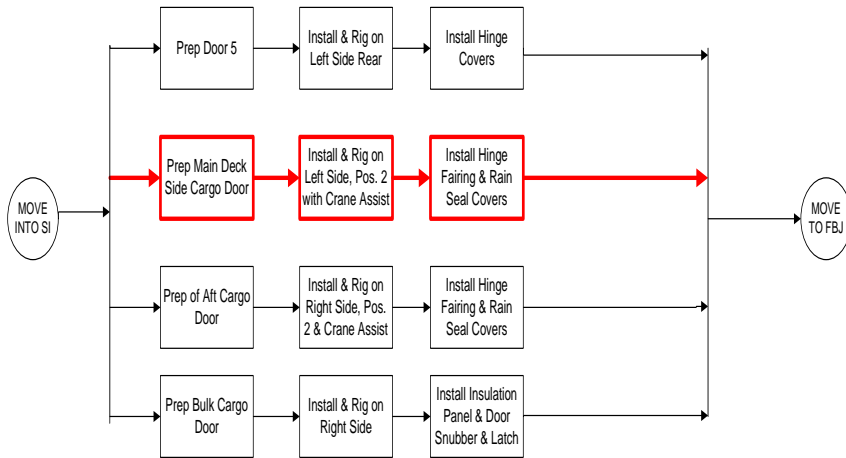


Spaghetti (foot path/distance) Chart

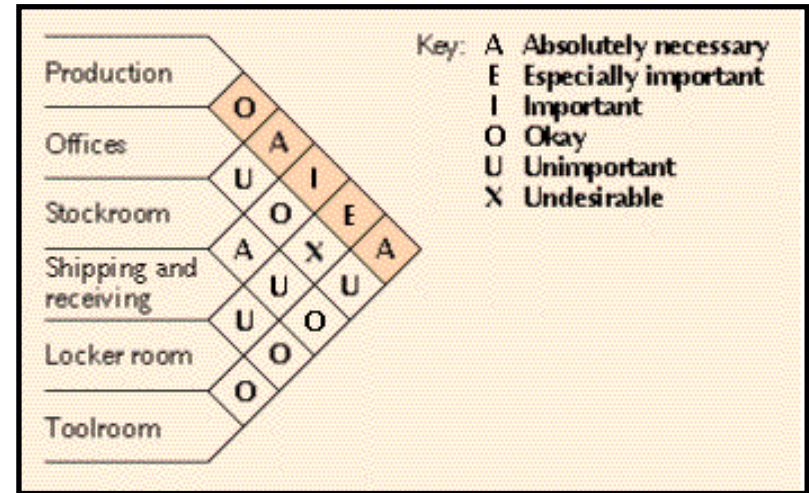


Sample Forms

Precedence Diagram (and *Critical Path*)



Activity Relationship Chart

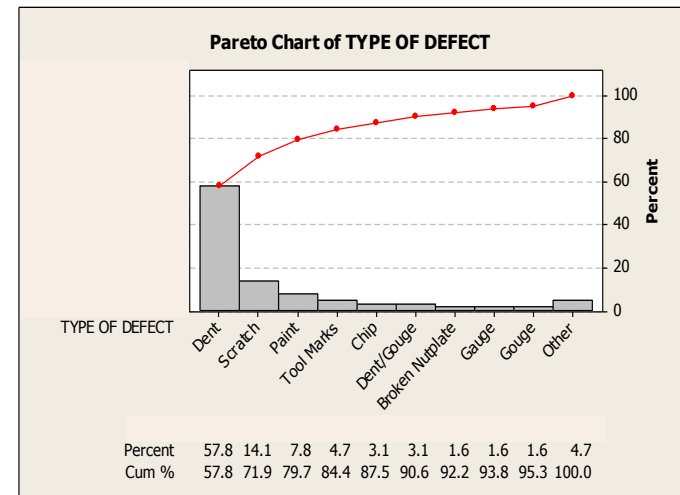


Shows importance of each department to other departments

Digital Picture

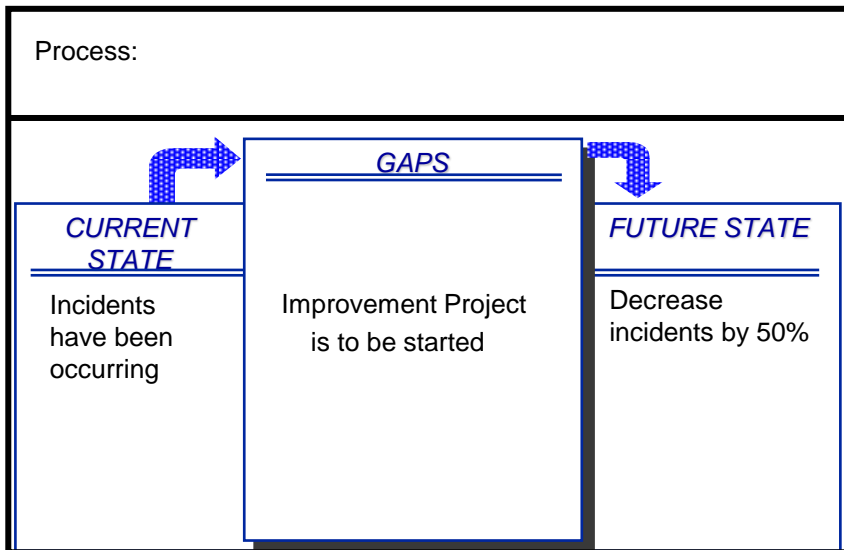


Pareto (80/20) Chart



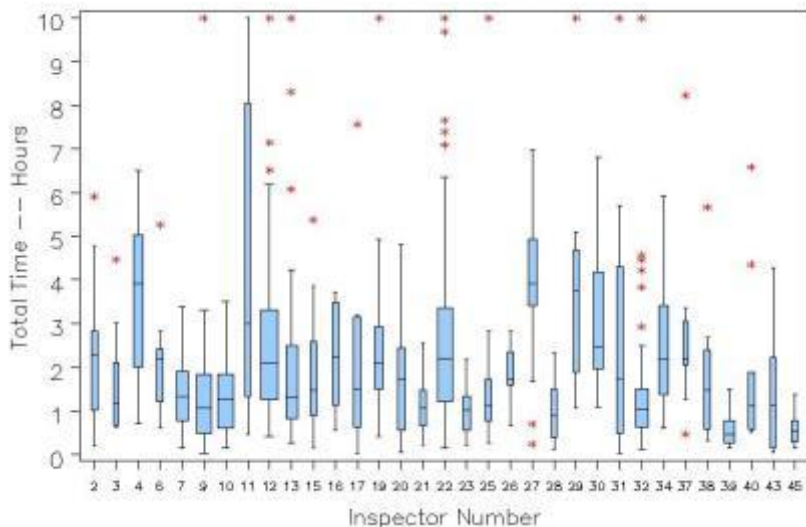
Sample Forms

Gap-to-Goal Chart



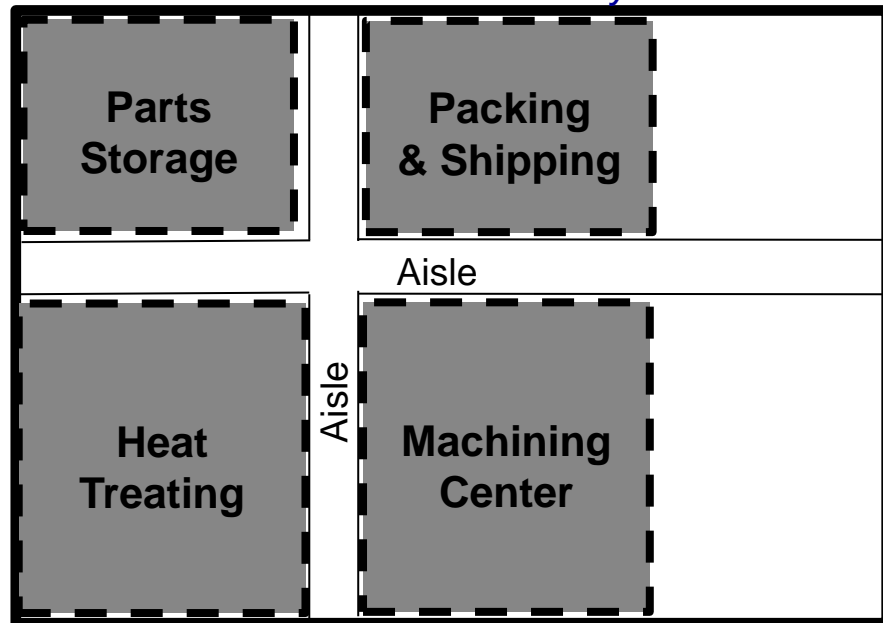
Shows activity needed to reach a Goal

Data Analysis



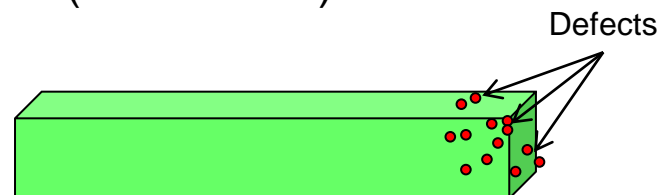
Space Utilization analysis

Plan View of Factory



75% utilization of available floor space
(25% free space)

Defect Locator ("measles") Chart



Sample Forms

From/To Chart

To Departments

	A	B	C	D	E	F
A		100 ft.	75 ft.	200 ft.	100 ft.	25 ft.
B			50 ft.	50 ft.	200 ft.	35 ft.
C				25 ft.	75 ft.	50 ft.
D					25 ft.	75 ft.
E						100 ft.
F						

Shows Travel Distance between departments

From
Departments

FEMA

(Failure Mode & Effect Analysis)

Least

Severity	Occurrence	Detection
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10



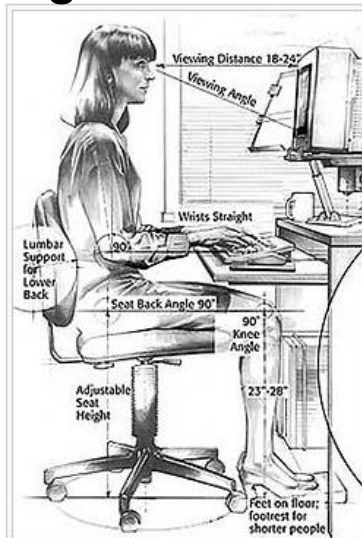
Most

Severity x Occurrence x Detection
= Risk Priority Number (RPN)
Highest RPN activity is worked first

$$\text{Sev} \times \text{Occ} \times \text{Det} = \text{RPN}$$

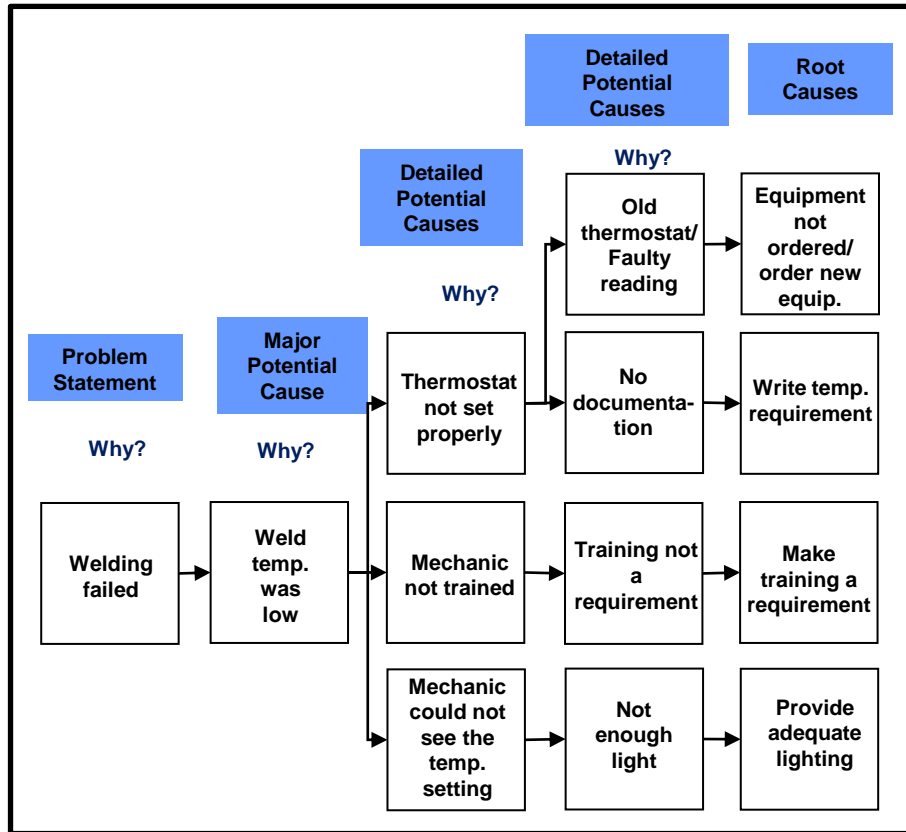
$$3 \times 5 \times 5 = 75$$

Ergonomic Data



Sample Forms

5-Whys Diagram



This example looks at Why a welding failed.

Plus/Minus Chart

Start a New IE Project?

Driving (Positive) Forces	Impeding (Negative) Forces
Will save money for company	← No help from shop, they are busy
Helps dept. goals	← Low priority given
Meets IE goals	← Difficult to get data
Helps production shop	← No guidance
Reduces flow days	← No sponsors of project
Improves throughput	

This example shows the reasons for & against, starting a new IE project.

Sample Activities

Tours / Observations

- Organize the tour with the process owner
- Get a guided tour
- See the surrounding areas on the tour
- Try to see normal conditions
- Ask lots of questions during the tour
- Take notes and debrief following the tour

Benchmarking

- Understand your own area and process first
- Plan when to do the benchmarking within the project
- Plan ahead what to Benchmark
- Get good comparison information & data
- Take notes and debrief following each benchmarking activity

Informational Interviews

- Prepare ahead who to talk to and some initial questions to ask
- Make sure they are experienced with the task being investigated
- Understand the problem from their perspective
- Listen for items to follow-up on later
- Don't rush their answer to a complex question
- Take good, organized notes

Simulation

- Understand your existing conditions before trying to build the simulation
- Use standard software that your company uses
- Build the model as simply as will meet your needs
- Run all options being considered through the model
- Document results and list all assumptions used