TWI – Training Within Industry

WISCONSIN MANUFACTURING
EXTENSION PARTNERSHIP

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TWI in the 1940’s

MISSION:

“to help industry to help itself to get out more materials than ever been thought possible, and at constantly accelerating speed”

to:

WIN A GLOBAL WAR
1940’s Mission “Accomplished”

There were over 1 million people trained in TWI during the war effort working in about 600 companies:

• 86% Increased production by at least 25%
• 100% Reduced training time by 25% or more
• 88% Reduced labor hours by over 25%
• 55% Reduced scrap by at least 25%
• 100% Reduced grievances by more that 25%
TWI Training Within Industry

- A 1940’s World War II effort, developed to help industry feed the war effort.
- In the 1950’s, Used to rebuild the infrastructure of Japan after the war.
- Today, The program has spread world wide (and stood the test of time for over 70 years,) and is as relevant today as then.
Today—We Compete Globally

Implementing Lean: (Continuous Improvement) *(The easy part)*

Sustaining Lean: (Continuous Improvement) *(The hard part)*
Are today’s supervisors better prepared?

According to a Gallup Poll:

80% of people leave their jobs because of their immediate supervisor.

The average cost to replace them is about 1.5 times their salary

*(when you can find qualified replacements)*
15 Human Relations Issues that Impact Employee Morale (survey of 25K people)

1. Showing employees appreciation for the work they’ve done
2. Communicating information and directions
3. Listening to ideas and concerns
4. Treating all employees fairly
5. Treating everyone with dignity and respect
6. Being sensitive to personal problems
7. Handling corrective action in a tactful manner
8. Job security
15 Human Relations Issues that Impact Employee Morale (survey of 25K people)

9. Good wages
10. Good fringe benefits
11. Opportunities for promotion and growth within the organization
12. Good working conditions
13. Providing a safe work environment
14. Adequate job/technical training
15. Permitting participation in decision making
It’s all about the people.

“In this age, I am painfully aware of the fact that people tend to forget the need for training. Of course, if skills to be learned are not creative or stimulating and if they do not require the best people, training may not seem worthwhile. But let’s take a hard look at the world.

No goal, regardless of how small, can be achieved without adequate training.”

Taiichi Ohno,
*Toyota Production System: Beyond Large Scale Production*, page 69.
Supervisors have 5+ needs

- Knowledge of Work
- Knowledge of Responsibilities
- Skill in Leading
- Skill in Instructing
- Skill in Improving Methods

Things supervisors need to do

Things supervisors need to know

Safety
Program Structure

• Each program has a four-step method
• Each program is structured in simple language
• Each program is structured for 3 hour sessions over a 5 day period, typically conducted on-site to minimize time away from work
• Class size is limited to a maximum of 12
• Each participant must demonstrate the skill by using the method on real life issues during class
Simple 4-Step Method

1. Preparation  
   *(Help the learner think to aid comprehension of the new idea)*

2. Presentation  
   *(Add the new idea to those already in the learner’s mind)*

3. Application  
   *(Train the learner to apply what was presented and check results)*

4. Testing  
   *(Test the ability of the learner to apply the new idea alone)*

* Developed by Charles R. Allen during WW2
Training Within Industries (TWI) provides:

- a systematic approach to help sustain changes and continuously improve by:
  - Challenging people to identify opportunities to improve their jobs.
  - Training people how to generate ideas to take advantage of these opportunities.
  - Showing people how to get ideas into practice right away.
  - Creating ownership for people to maintain standard work.
  - Strengthening personal relationships
  - Creating an environment that is safe and encouraging staff to take on more responsibility for success.
  - Multiplying results by passing on the skills
Continuous Improvement Activities

Lean, TOC, Six Sigma, etc. (Continuous Improvement) efforts strive for this stair step growth.
Continuous Improvement is not always continuous!

Plan to “stabilize”

Reality = “regress to old habits or behaviors”

Revised slope
Are your gains being sustained?

- Operating from crisis to crisis?
- Resistance to change?
- Abandoned Improvement efforts?
- “Meet the Numbers” No time to Improve?
- Team based Culture?
- Silo Mentality?
- Processes Stable/Standardized?
- Costs under Control?
- Predictable Quality?
- Morale?
“Sustain the Gains”

JI/JR

JM

KAIZEN

Continuous Improvement tools, focus on process development

Complimentary Strategies

TWI focuses on people development

Lean Project

TIME

$
Lets take a look . . .

• JOB RELATION (JR)
• JOB INSTRUCTION (JI)
• JOB METHODS (JM)
• JOB SAFETY (JS)

The TWI approach focus: “Current Problems”
• Output
• Quality
• Scrap
• Rework
• Cycle Time
• Relationships
• Standards
• Safety
Job Relations (JR)

Helps supervisors/team leaders/others:

1. Maintain positive employee relations by evaluating and taking proper actions
2. Solve and prevent problems, then resolve conflicts when they arise.

Results:

- Improved employee relations and morale
- Fewer grievances
- Improved attendance
- Less equipment damage
- Improved productivity, quality, and profits
How to Prevent Problems

- Let each worker know how he/she is doing
- Give credit when credit is due
- Tell people in advance about changes that will affect them
- Make the best use of each person’s ability
How to Handle a Problem

DEFINE YOUR OBJECTIVE

Step 1: Get The Facts
Get the whole story

Step 2: Weigh And Decide
Don’t jump to conclusions

Step 3: Take Action
Don’t pass the buck

Step 4: Check Result
Did your action help production?

DID YOU ACCOMPLISH YOUR OBJECTIVE?
Job Instruction (JI)

How to teach people to quickly learn to do a job correctly, safely and conscientiously.

Results:

- Reduced training time
- Increased production
- Fewer accidents
- Increased job satisfaction/morale
- Improved quality
- Less scrap and rework
- Increased profits
- Less equipment and tool damage
- Standardized work
- Quality consistency
How do we train our people?

- Shadow more experienced worker?
- Let HR do it?
- Read the manual?
- Buddy system?
- Classroom instruction?
- Throw them over the wall?

What does your orientation program look like?

How is it working?
How we Instruct

TELLING
Telling may not work by itself. . .

We also instruct by...

“SHOWING”
How to Get Ready to Instruct

1. Make a Timetable for Training
2. Break down the Job
3. Get Everything Ready
4. Arrange the Worksite
### Break Down the Job

#### No. __________

**JOB INSTRUCTION BREAKDOWN SHEET**

**Operation:** 

**Parts:** 

**Tools & Materials:**

<table>
<thead>
<tr>
<th>IMPORTANT STEPS</th>
<th>KEY POINTS</th>
<th>REASONS</th>
</tr>
</thead>
</table>
| A logical segment of the operation when something happens to advance the work. | Anything in a step that might—  
1. Make or break the job  
2. Injure the worker  
3. Make the work easier to do, i.e. “knack”, “trick”, special timing, bit of special information | Reasons for each key point |

**WHAT YOU DO**

**HOW YOU DO IT**  
And Why we do it that way!

**WHY YOU DO IT**
# Training Timetable

| Name: Jones  
| Dept.: 2nd Electrical Dept.  
| Date: (today's date) |

<table>
<thead>
<tr>
<th>Breakdown No.</th>
<th>Smith</th>
<th>Lark</th>
<th>Morse</th>
<th>Taylor</th>
<th>Massy</th>
<th>Peters</th>
<th>Baker</th>
<th>Changes In Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembling Parts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Wiring</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combining</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knot tying</td>
<td>123</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X/X</td>
<td>Need 1 more worker at end of (month).</td>
</tr>
<tr>
<td>Clamping</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X/X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Adjustment</td>
<td>✓</td>
<td>X/X</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Turnover**

**Work Performance**

<table>
<thead>
<tr>
<th>Scheduled to retire</th>
<th>Needs more training</th>
</tr>
</thead>
</table>
Job Methods (JM)

Trains supervisors/leaders how to analyze jobs to make the best use of people, machines and material now available.

Results:

- Reduced cost
- Reduced WIP
- Reduced inventory
- Increased throughput
- Increased profits
- Continuous improvement
4 Step Method

1. Breakdown the Job
2. Question Every Detail
3. Develop the New Method
4. Apply the New Method
### Job Breakdown Sheet

**PRODUCT:**

**MADE BY:**

**DATE:**

**OPERATIONS:**

**DEPARTMENT:**

<table>
<thead>
<tr>
<th>PRESENT/PROPOSED METHOD DETAILS</th>
<th>REMARKS</th>
<th>IDEAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distance</td>
<td>TIME/TOLERANCE/REJECTS/SAFETY</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Write them down, don’t try to remember.**

- **Eliminate**

- **Combine**

- **Rearrange**

- **Simplify**

---

**STEP 1: Break Down the Job**

- **Dis**
- **tance**
- **WHY**
- **WHERE**
- **WHEN**
- **WHO**
- **HOW**
Step 2: Question Every Detail

*Why* is it necessary?

*What* is its purpose?

*Where* should it be done?

*When* should it be done?

*Who* is best qualified to do it?

*How is* “the best way” to do it?
Step 3: Develop the New Method

- Why?
  - What?
- Where?
  - When?
  - Who?
- How?

- Eliminate
- Combine
- Rearrange
- Simplify
Improvement Proposal Sheet

Submitted to:
Made by:
Product/Part: Operations:

Department:
Date:

The following are proposed improvements on the above operations.

1. Summary

2. Results

<table>
<thead>
<tr>
<th></th>
<th>Before Improvement</th>
<th>After Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production (one worker per day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine Use (one machine per day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reject Rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Operators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Content
Step 4: Apply the New Method

1. Sell the change to others
2. Obtain necessary approvals
3. Put the new method to use right away
4. Credit those involved

(Document the new standard, then continue to improve the new method)
The Three Original TWI Programs . . .

work together like a three-legged stool — take one leg away and the stool falls down. JS acts as the seat to hold it all together

JR – Positive Environment
JI – Stabilized Processes
JM – Continuously Improve
JS – Work Environment

(Developed by Toyota in the 1950’s)
Job Safety (JS)

- Engaging employee’s in identifying potential safety hazards and eliminating them.
- Breaking the chain of events that lead to incidents and injuries.
- Builds improved work environments and staff confidence.
- Compliments current OSHA and EPA training and regulations. TWI JS incorporates a methodology to implement OSHA and EPA regulatory intentions.
- Increases safety awareness.
Job Safety (JS)

“BREAK THE CHAIN”

Indirect       Direct (Causes)
Items          Causes      Acts &   Incidents   Injuries
               Conditions
4 Step Method

STEP 1  SPOT THE CAUSES OF DANGER
STEP 2  DECIDE ON THE COUNTERMEASURES
STEP 3  ENFORCE COUNTERMEASURES
STEP 4  CHECK RESULTS
JS is not OSHA Training

OSHA Training: 10 hour or 30 hour classes covering Knowledge

Slips/Trips; Injuries: Electrical Hazards; Machine Guarding; Haz Com; Backs/Ergonomics; Fire Danger; Evacuations; PPE; General Duty Dangers; Access; etc.

JS covers skills to see the danger before it happens.
## Safety Analysis Table

<table>
<thead>
<tr>
<th>ITEM</th>
<th>INDIRECT CAUSES</th>
<th>DIRECT CAUSES</th>
<th>INCIDENT</th>
<th>INJURY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PEOPLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>THINGS</td>
</tr>
<tr>
<td>COUNTERMEASURES</td>
<td></td>
<td></td>
<td></td>
<td>ESTIMATED COST</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MONEY</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TIME</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>THINGS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OTHER</td>
</tr>
</tbody>
</table>
Sustain the Gains

• Enlist an internal Champion
• Set up a Steering Committee
• Pilot the efforts (Concentrated Focus)
• Roll out slowly (Minimize/control variation)
• Enlist accountabilities (Rules/policy)
• Audit the Process
TWI - the Missing Link to Lean

Strategies don’t produce: *People Do!*

Continuous Improvement

- Pull/Kanban
- Cellular/Flow
- TPM
- POUS
- Quality at Source
- Quick Changeover
- Standardized Work
- Batch Reduction
- Teams
- Visual
- 5S System
- Plant Layout

(Mortar)

(TWI Culture)

(Tools)

Value Stream Mapping

Wisconsin Manufacturing Extension Partnership
How TWI Supports “Everyday Engagement”

Gallup’s Employee Engagement Survey

1. I know what is expected of me at work. 
2. I have the materials and equipment I need to do my work right. 
3. At work, I have the opportunity to do what I do best every day. 
4. In the last seven days, I have received recognition or praise for doing good work. 
5. My supervisor, or someone at work, seems to care about me as a person. 
6. There is someone at work who encourages my development.
How TWI Supports “Everyday Engagement”

Gallup’s Employee Engagement Survey

7. At work, my opinions seem to count. [JR JM]
8. The mission or purpose of my company makes me feel my job is important. [JI JR JM]
9. My associates or fellow employees are committed to doing quality work. [JI JM]
10. I have a best friend at work. [JR]
11. In the last six months, someone at work has talked to me about my progress. [JI JR]
12. This last year, I have had opportunities at work to learn and grow. [JI JR JM]
TWI = Investment in Your People

- Indoctrinates people into an “improvement” frame of mind.
- Teaches people how to identify opportunities for improving their jobs.
- Trains people how to generate ideas to take advantage of these opportunities.
- Shows people how to get these ideas into practice right away.
- Creates ownership for people to maintain standard work.