

GRADE SCHOOL ROBOT ASSEMBLY PROJECT

THE CHALLENGE

Considering the trade school and apprenticeship roots of Job Instruction Training (JIT), it should not be a surprise that operators ranging in ages 8 to 13 properly trained and placed in a world class manufacturing cell, can succeed in assembling zero defect complex machines in a one-time only run! This is exactly what occurred with the gifted and talented (GT) program when Lean Manufacturing techniques and TWI-JIT was adopted to assemble toy robots.

THE PROJECT

Each robot set contained 103 discrete parts. The project had to equally include all of the children in the school's GT program, not just a single grade level. Contribution had to be the same for the entire group, which meant not too simple for an eighth grader and not too complex for a second grader.

Four teachers were assigned groups of twenty-five students of all ages. After assembling one of the robots, one of the teachers realized that the assembly job would be a challenge for any eighth grader and that getting the children with less mechanical acumen to actually complete their projects would be near impossible.

ACTION

After consultation with a Lean field engineer and TWI Institute Certified TWI Institute JI Trainer, the teacher decided that the only chance the children had in completing the assembly task would be to use all applicable lean manufacturing techniques, including TWI Job Instruction training.

The teacher went about reassembling and timing each of the logical assembly steps as presented in the robot assembly instructions. In order to provide point of use storage (POUS) for each station within the cell, it necessary to kit individual parts from each of the twenty-five robot sets. After collecting all the data, some of the assembly steps were recombined in consideration of: skill level necessary, and a takt time that would allow for the assembly of all twenty-five robots in a forty-minute period.

To be sure that no child sat idle and that the forty minute time limit would be kept, the cell was loaded before the children's work began. Each of the production stations would need to be staffed according to complexity. Some of the more elaborate assembly operations were assigned to inclined older children with better dexterity, or those with a background in hobby modeling. The less complex assembly stations were assigned accordingly to younger and/or less skillful children.

Regardless of the ingenuity inherent to a production cell, the assembly operations would have to be performed competently and in due time by the children. The four-step JIT method was used to instruct each of the child operators in advance by first producing a job breakdown sheet for each station; then making sure each of the children was properly prepared for the forty-minute production session.

RESULTS

This was the only cell participating in this multi school project that had every robot that came out of the cell pass the required functional test on the first try.

CONCLUSION

Lean promotes productive practices. TWI builds the skills necessary to execute the practices.