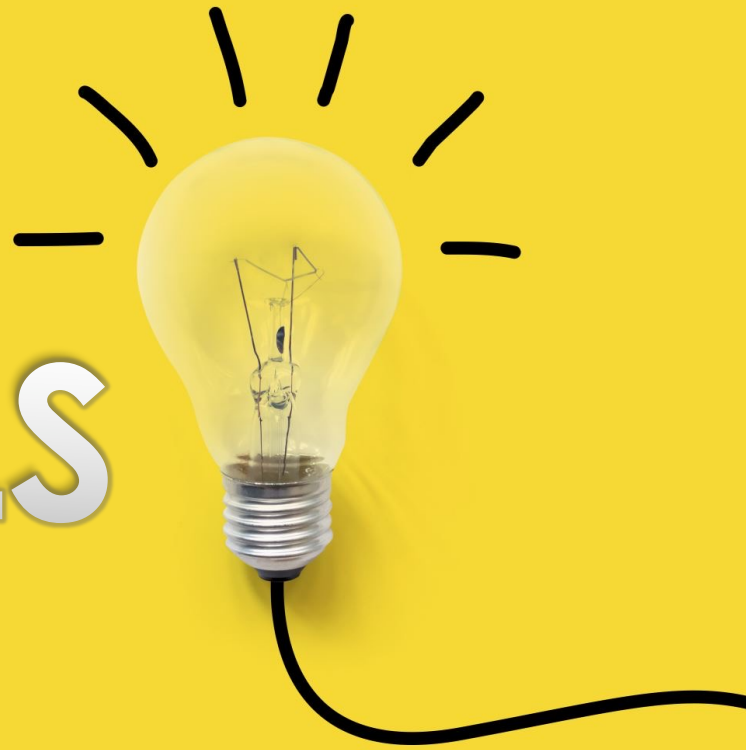




# EMBRACING CHANGE THROUGH TECHNOLOGY



# GOALS



**IMPROVE SAFETY**  
**REDUCE LABOR**  
**IMPROVE QUALITY**  
**MAXIMIZE THROUGHPUT**  
**INCREASE EFFICIENCY &  
PRODUCTIVITY**  
**INCREASE MARGINS**  
**IMPROVE WAGES & BENEFITS**  
**SUCCESS FOR ALL!!!**

**1994**

**BEGIN WITH THE END IN MIND**

TRILOGY CNC HISTORY:  
INCREMENTAL IMPROVEMENTS...BABY STEPS  
THAT LEAD TO CHANGE

1994 MOTION MASTER DUAL SPINDLE  
1995 MOTION MASTER 6 TOOL CHANGER  
1999 QUINTAX TRAVELING TOOL CHANGER  
2012 DMS 12 TOOL CAROUSEL FULLY ENCLOSED  
2018 DMS 18 TOOL CAROUSEL FULLY ENCLOSED  
2020 DMS WITH ADAPTIVE END OF ARM  
TORQUE SENSING HEAD

**13 MOLDING MACHINES**

**6 CNC WORK CENTERS**

**80% OF OUR PLANT 1  
ENGINEERED PRODUCTS FLOW  
THROUGH 5 CNC ROUTERS**



# 1994

- **LAWN MOWER**
- **FIVE ROTO PARTS**
- **57 ROUTED AND DRILLED FEATURES**



- **MANUAL OFF LINE LABOR:**
  - **45 MIN. 4 PEOPLE & 15 FIXTURES.**
- **CNC FIXTURES: 6**
- **CNC TIME: 6 MIN.**
- **TOTAL PEOPLE: 1 CNC OPERATOR & 1 OFF-LINE HELPER.**





## Fundamentals for CNC success

### 1) Advanced planning, Communication, Execution

Well in advance of actual set-up have the fixtures, gauges, components Packaging, TDP documents & area prepared & organized

#### TEAMWORK:

Communication between CNC Team leader, material handler and Quality is key to keep the process flowing efficiently

QA & CNC op to have advanced schedule to plan & prepare for 1st pc.

### 2) Organized work area

Keep work area free of clutter. Have set-ups & put aways staged so not to interfere with work flow but yet near enough to efficiently do change outs.

Correct process flow of WIP in & WIP out is critical. Counterclockwise U shape work flow is preferred. Do not cross path work flow

### 3) Target EOQ runs

Running less than EOQ amount reduces the efficiency rate due to not fully absorbing the amortized set-up time

See workbook tab for EOQs

EOQ is the economic order quantity based on set-up, part size & run time.

Typically the minimum amount of parts to run through the router for each job.

### 4) Tandem secondary & CNC teams

Whenever possible it is an efficiency booster to have the secondary functions performed in tandem with the CNC operations to expedite product flow & throughput. See list of tandem parts tab

### 5) Keep routers running during breaks & lunch

CNC floater / team leader to provide breaks

Same concept as used at molding in order to keep machines running.

Stager breaks & float operators is another option.

### 6) TABLE Swap

Set-up dead table when possible while running another program.

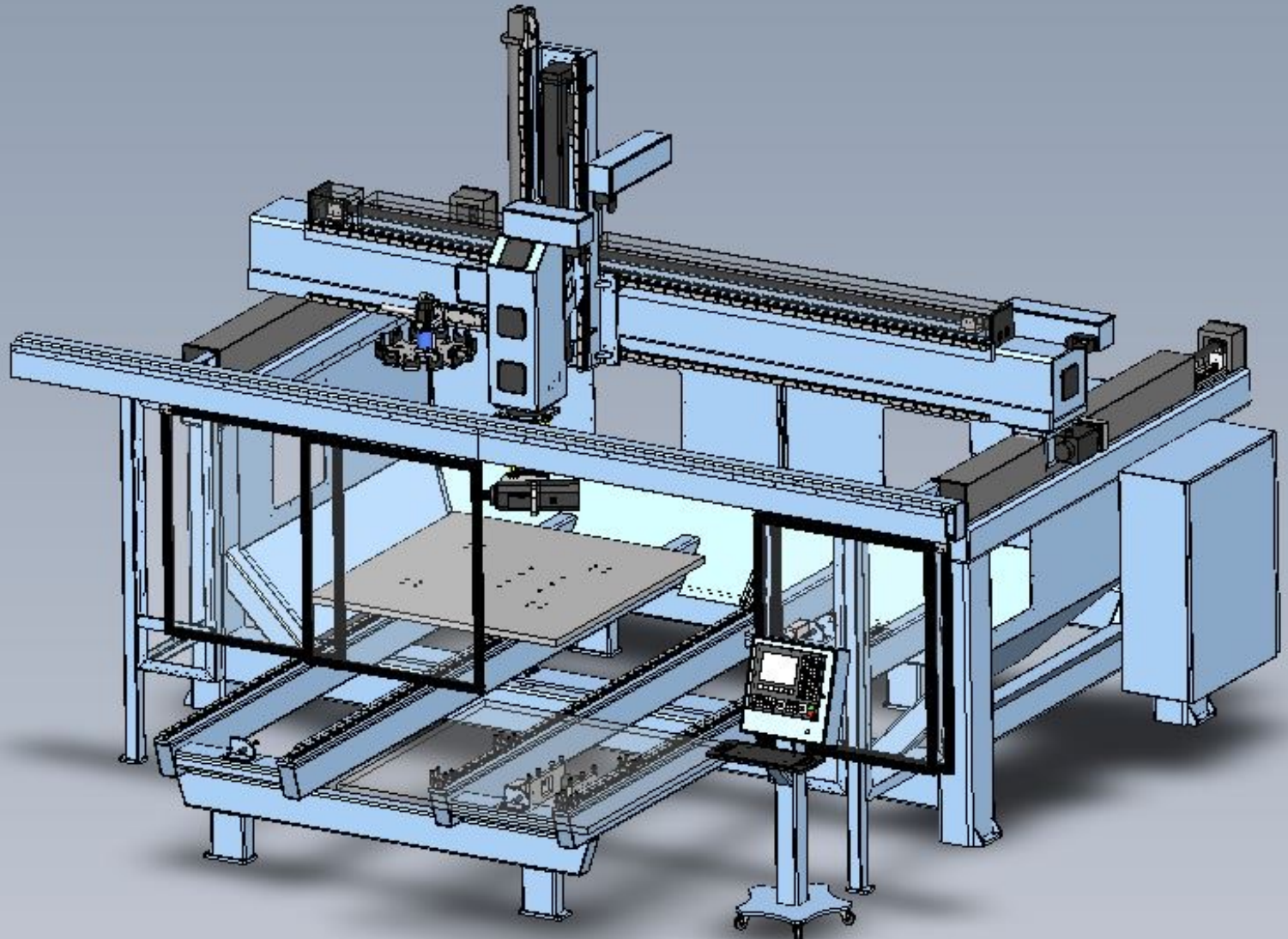
This saves you the entire set-up time of the next job.

Part of advanced planning strategies.

### 7) Daily review & assesment of CNC production via engineering database

See operator performance chart tab for 2011

# CNC





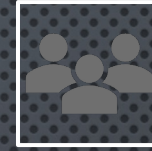
# TANDEM TEAMS



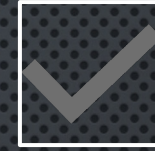
Op1 loads & unloads parts, continually feeds the machine



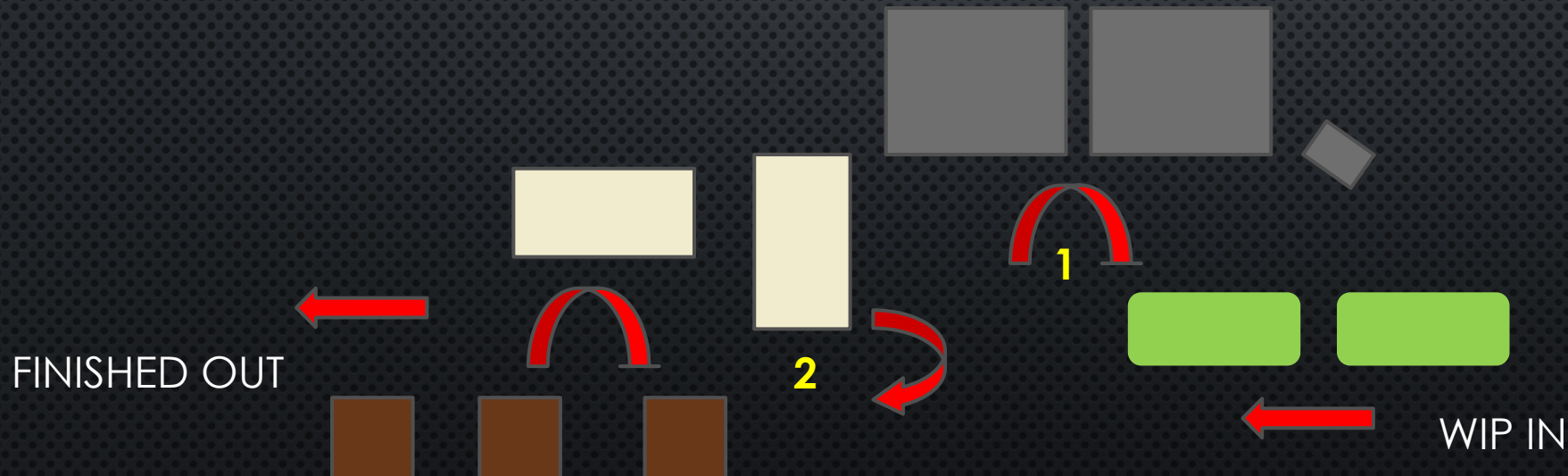
Op 2 works on adjacent table / workstation doing off line value added assembly, drilling, finishing and packout



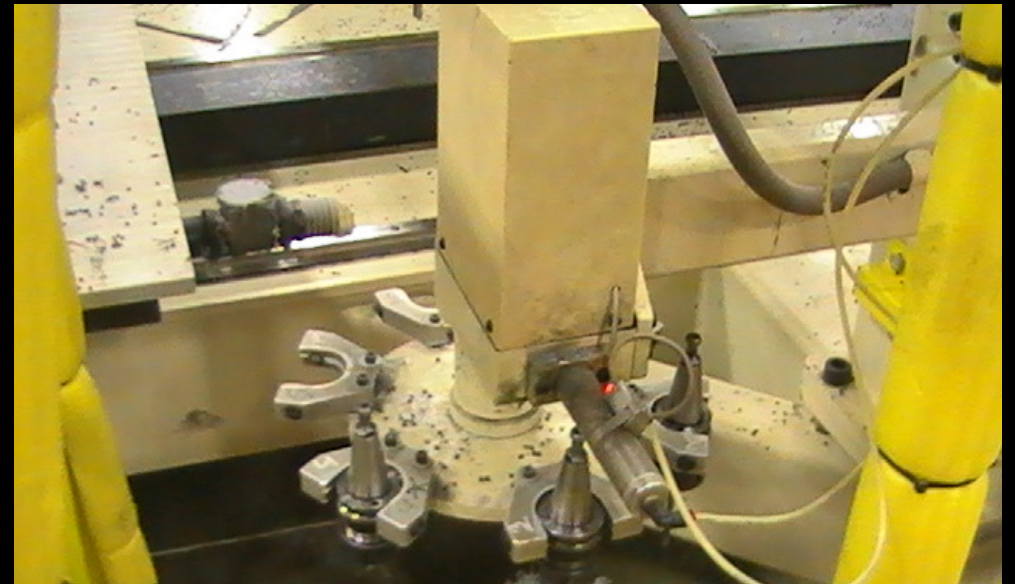
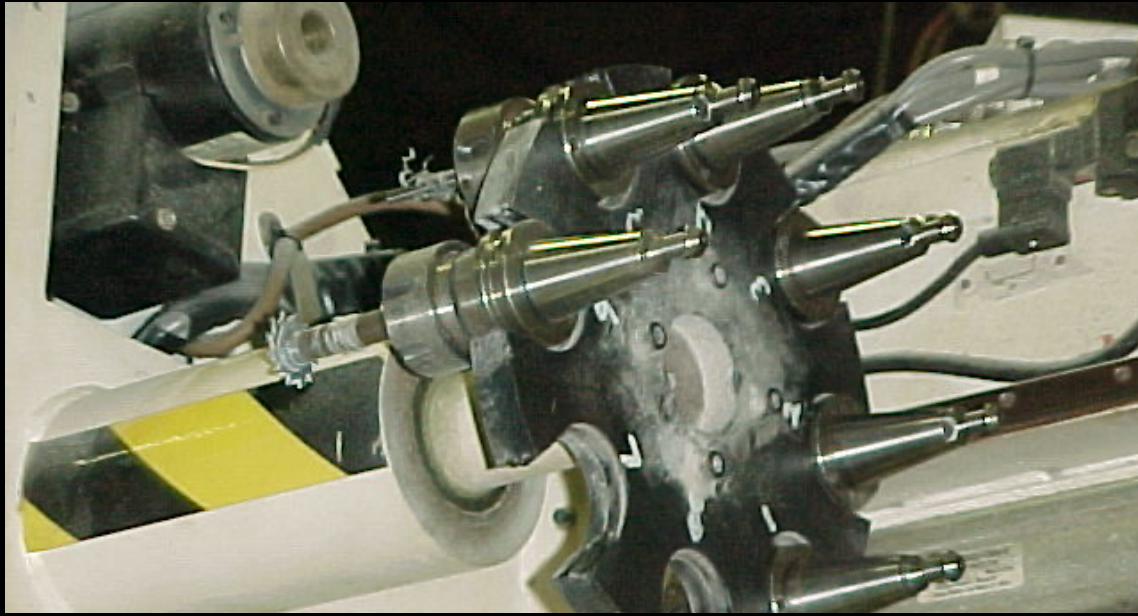
Work as a team in synchronicity



LEAN 6S ORGANIZED WORK CELL = SMOOTH EFFICIENT PROCESS FLOW









# SPINWELDING



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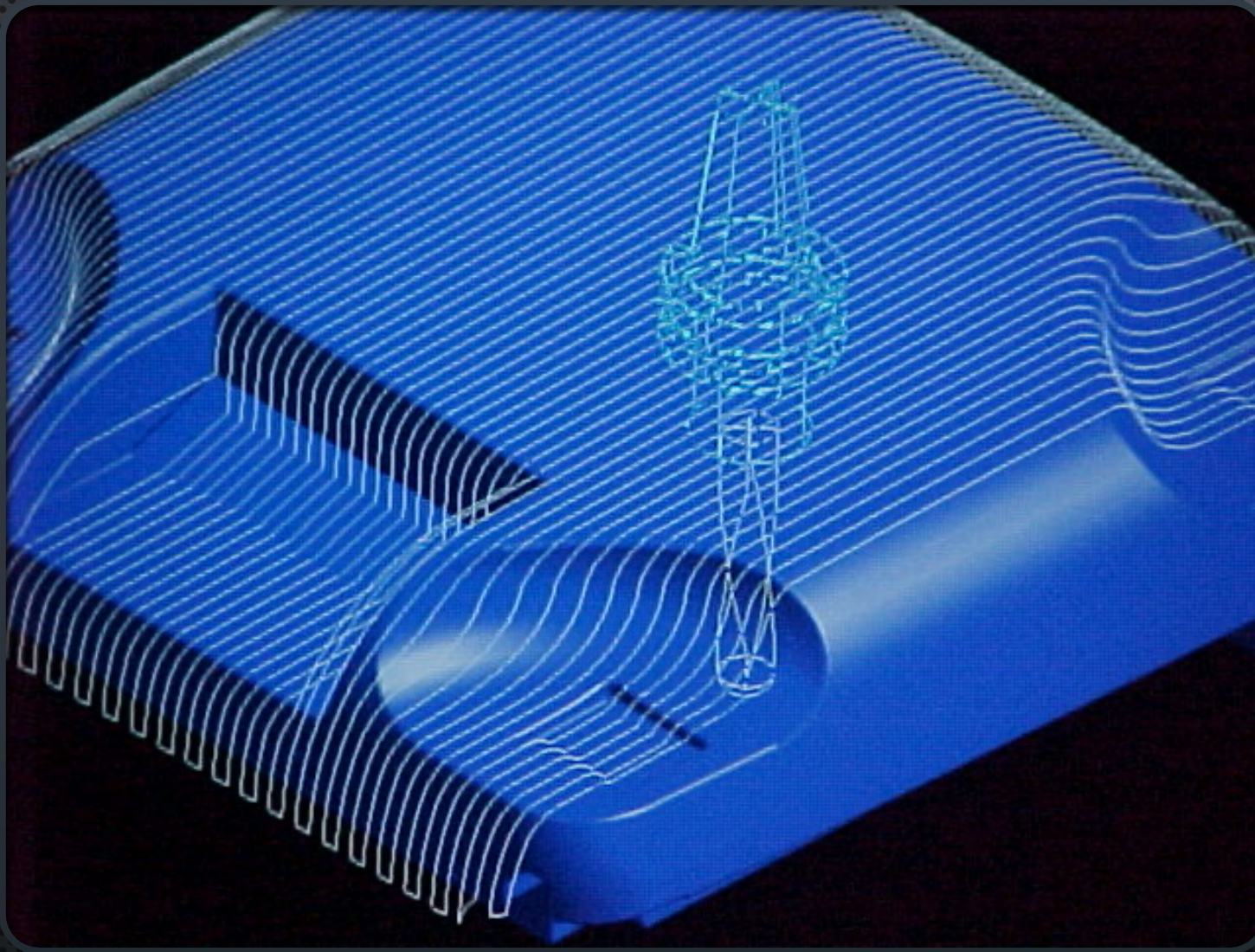


# DUAL TABLE GANGED FIXTURING



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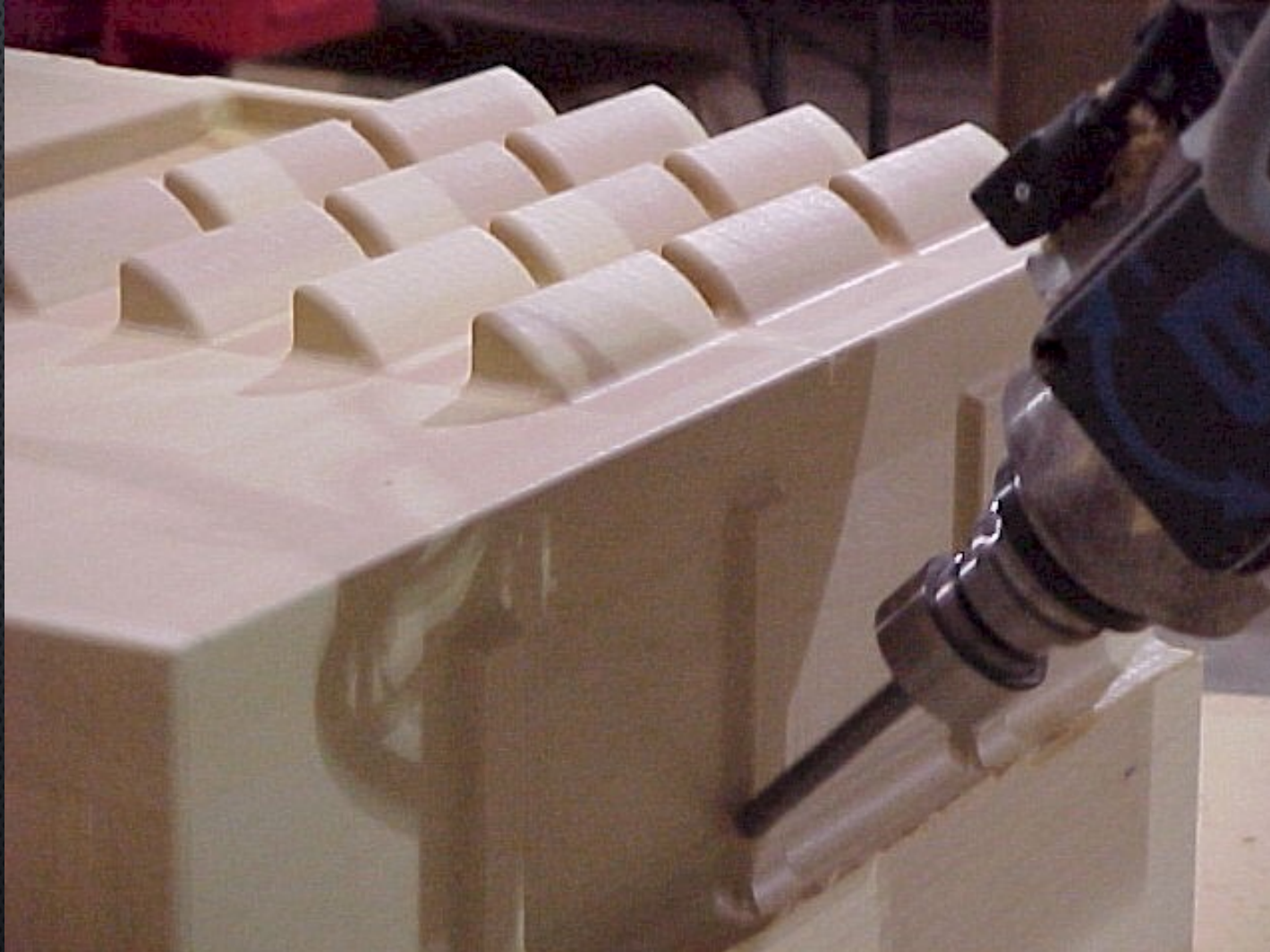




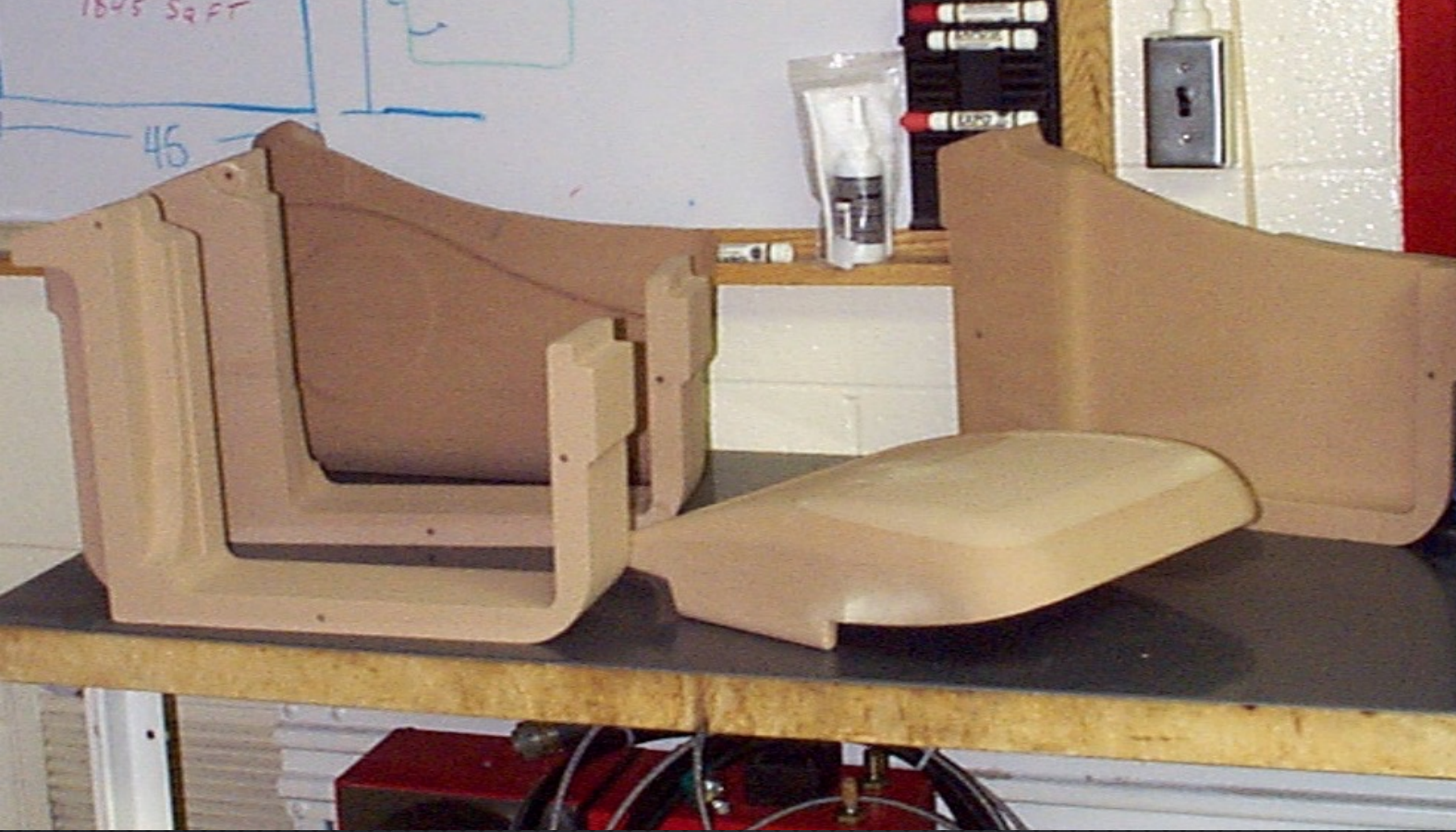
# MODELING, TOOLPATH GENERATION



# MODELING, 5-AXIS CUTTING



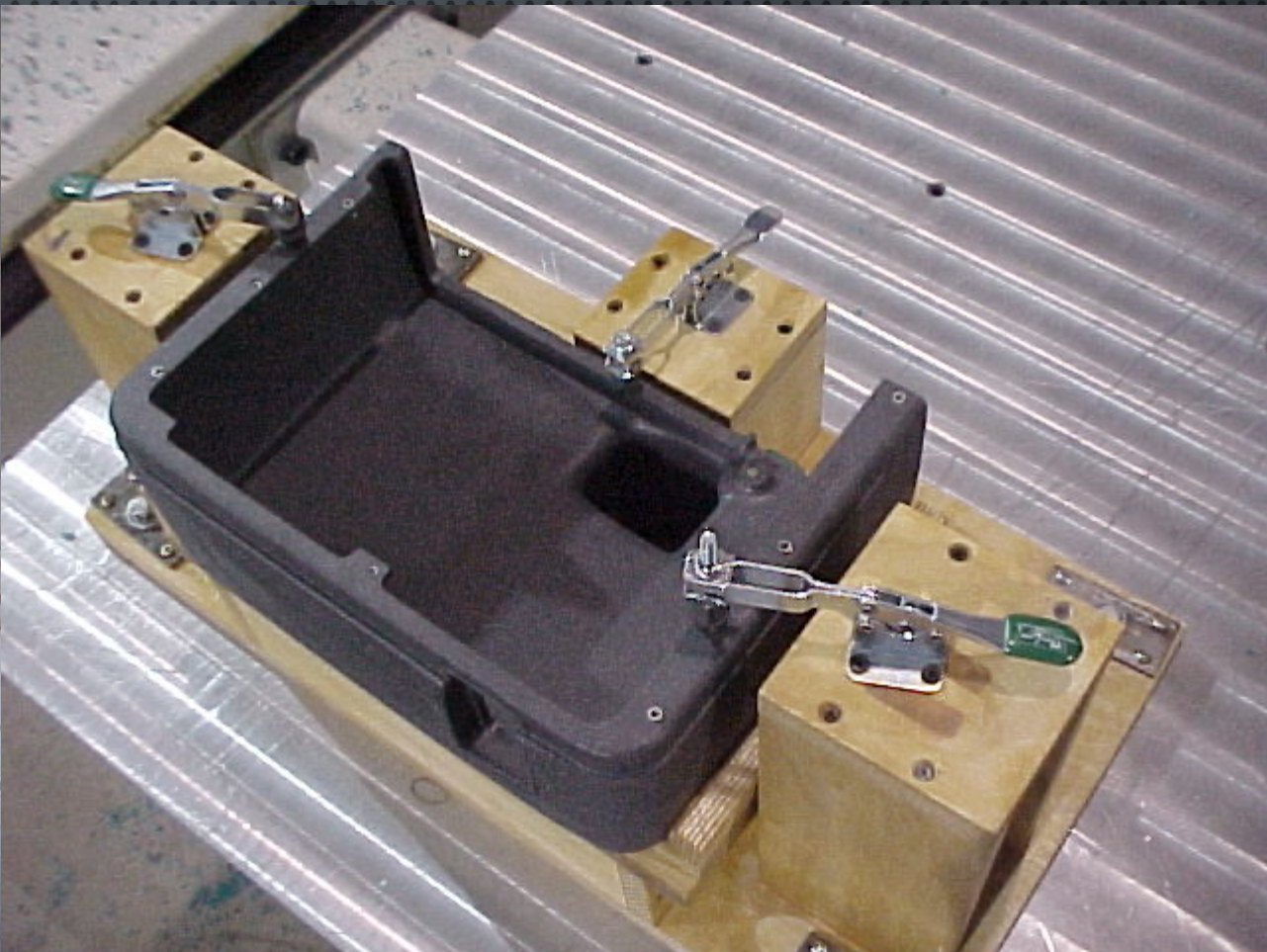
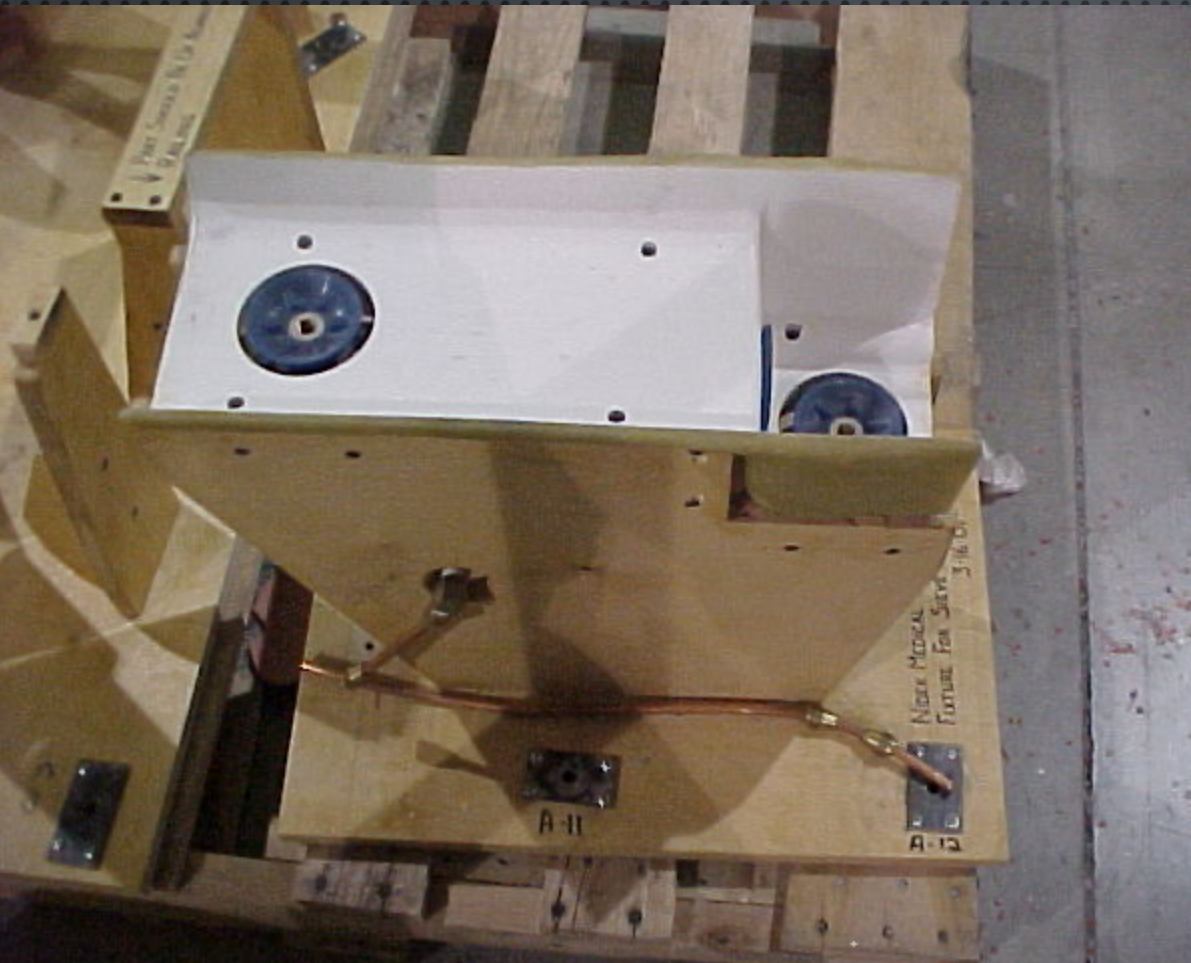




# MODELING, SECTION LAYERING



# FIXTURING







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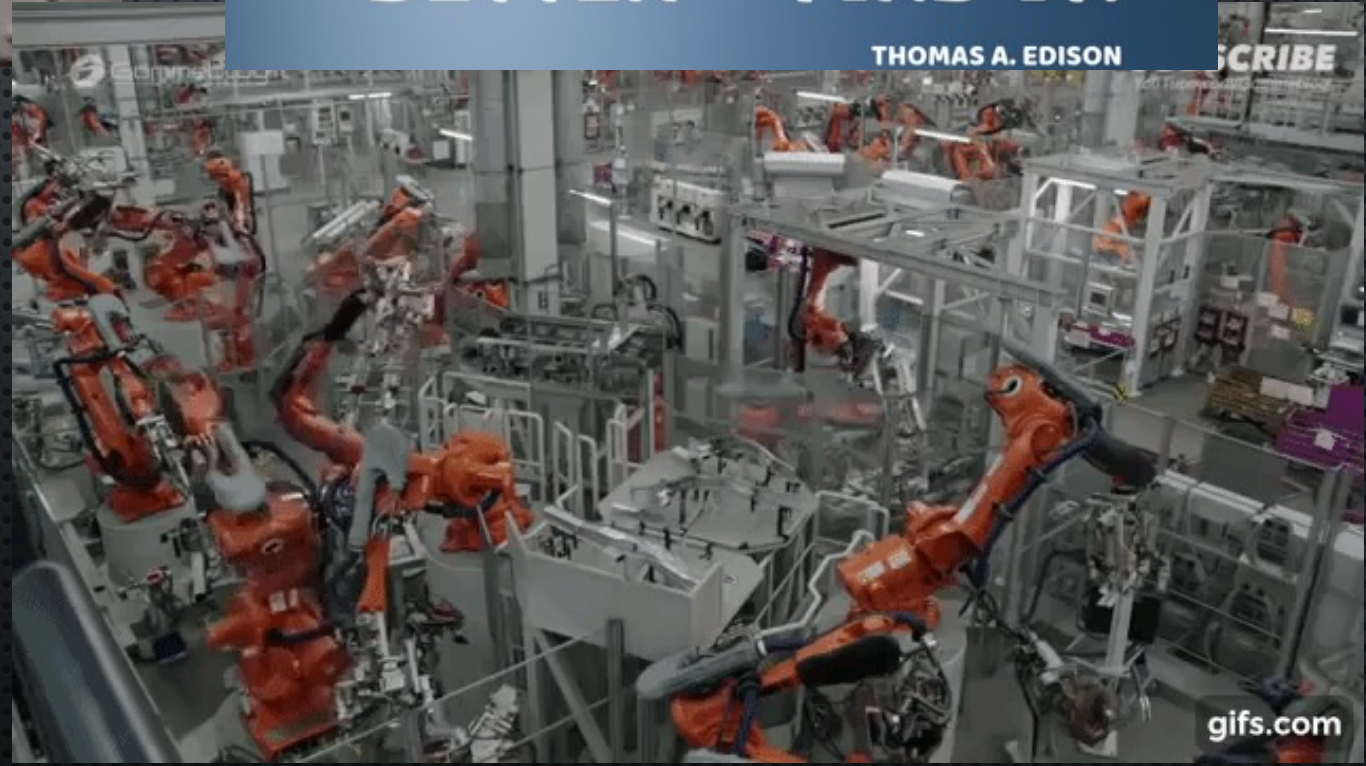
**THERE'S A  
WAY TO DO IT  
BETTER – FIND IT.**

THOMAS A. EDISON

“The only way to discover the limits of the possible is to go beyond them into the impossible.” –Arthur C. Clarke

***What's Next?***

Embracing Change Through Technology



SCRIBE

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