Quality Process

- Realizing the problem
- Understand the process
- Conduct tests
- Make recommendations
- Implications of suggestions
Silver Line aims to produce exceptional windows for its customers

The 8500 line did not meet expectations

Our goal:
- Set out to make welding process more efficient
Too many windows were not passing quality tests because welds were found to be too weak

- Good Weld
- Bad Weld
Compound enters Extrusion Machine

Vinyl comes out of extrusion machine

Inspect Vinyl

PASS

FAIL

Vinyl is reground into a compound

Machine is adjusted accordingly

Extrusion
Glass Process

Start

Trace template onto Glass

Cut Glass

Clean Glass

Clean Grids

Place Grids into Window

Lay Spacers into window

Put the top of the Window on

Heat Window
Video of Welding
The accepted measurement.
Tolerance is 1/16” for each side.
Example

- 20” target
- 19 15/16” lower limit
- 20 1/16” upper limit
Length Test

- Measured each piece of the windows frames and compared our results with the computerized measurements.

- There is a deviation between the average measurements and their target goals but minimal.
Infrared guns were used to measure the temperature of the plates as they heated the vinyl.

- We assessed if the machine cooled down after consecutive uses or took too long to heat back up to the machine’s prime temperature after cooling between uses.
Heat/Time Trials

- Heating and fusion phase remained constant
- Constant Temperature

<table>
<thead>
<tr>
<th>Number</th>
<th>Heat (°F)</th>
<th>Time of Heating (sec)</th>
<th>Time of Fusion (sec)</th>
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<td>Average</td>
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Breaking Test

- Lever arm and spring scale
- Five vinyl frames were made at
  - 1/16” under the target level,
  - target level,
  - 1/16” over the target level.
- Each frame cut into 4 pieces
- Force measured and recorded
Break Test Cont.

- Target length has the least standard deviation
- **The shorter frames produced the strongest welds**
- The longer welds produced the weakest welds.
Results

- Time of heating and fusion remained constant
- Cutting machine rarely cut vinyl to wrong length
- Strength of weld was greater for pieces cut below target value than above or at target value
Recommendations

- Cut each vinyl piece 1/32” shorter
  - This will make more of the welds stronger
  - Saves money
- Keep check sheets
  - Makes future tasks easier
  - Help monitor the different defects
- Ask for employee feedback
  - Employee knowledge
Conclusion

- Save money
- Boost morale
- Easier in future
- More efficient process
Acknowledgements

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Thank You

WE'VE BEEN Framed