

A Case Study in Job Shop Automation:



Texas ProFab Corporation

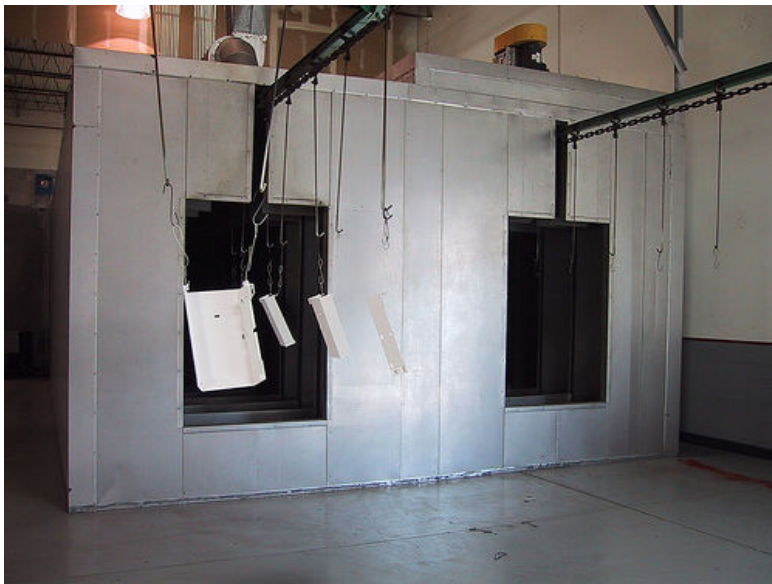
<http://www.texasprofab.com>

Vivek Gupta - April 17, 2007

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Company Background

- Extension of the Family Business of Premium Finishings (Premium Quality Powder/Liquid Coatings, Silk Screening, etc.)



Fortunate Capital Structure

- Very conservative capital structure in order to survive extreme cyclical swings.
- A family business is more concentrated on sustainability as opposed to Return on Equity, thus the company was run free of external leverage (debt) or shareholders.
- Also saves energy generally expended dealing with shareholders & bankers.

Niche Market & Difficulties

- TPF was to serve less price sensitive niche market for high quality, but the actual sheet metal manufacturing industry showed to be relatively commoditized, unlike the finishings business.
- Focus on operational efficiency (lean principles, etc.) proved to be more critical than originally perceived.

Served Niche Market

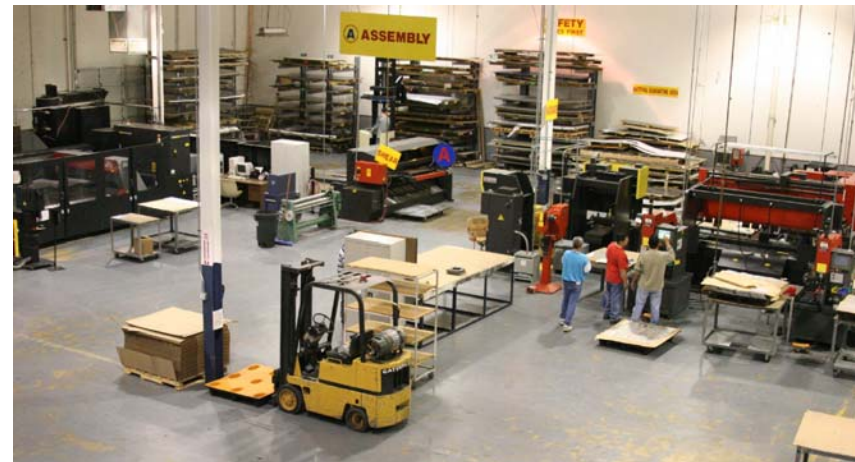
- To leverage existing relationships, we focused on the generally unloved niche of **high mix, low volume parts with demanding service needs**. With a focus on having the best lead times (helped by having a one-stop shop with finishing) and high service level, we hoped to extract higher than industry standard margin levels, and to be somewhat differentiated.

Synergy

- Buzzword that gets thrown around a lot, but truly existed here between the finishing facility and sheet metal fabrication.
- Customer base was highly correlated, end customers were effectively shared, logistics costs and lead times eliminated.
- Better Service Level and Control over lead times and operations.

Getting Started: *Equipment*

- A single multiple of everything was purchased to give us complete ability – turret punch press, laser, spot welder, tool grinder, press brakes, welders, etc. No automation, per se . . . yet.



Getting Started: *People*

- **Skilled Labor:** With only one of each machine, we were restricted to highly skilled setup operators to provide the technical foundation. Scale would have to come later.



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Jump Into Automation

- Began exploring Automation in the 3rd year of Company Operation. Invested a great deal in automation (numerous software packages, automated laser & tower, hardware insertion, etc.)



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Pretty Machine, But Why?

- Why does it make sense to buy so much automated equipment in a small job shop that focuses on high mix, low volume work?
 - Some Reasons are Obvious, Some Are Not.
- Automation can extend past physical manufacturing processes, and into less tangible processes like engineering.

Smaller Labor Requirement

- One of the obvious reasons is that, since the machine can change its own pallets, after setup . . . no shop labor is required, other than unloading upon job completion.
- This offers savings on overtime pay when excess production is needed, as well.

Decreased Dependence on Scarce Labor

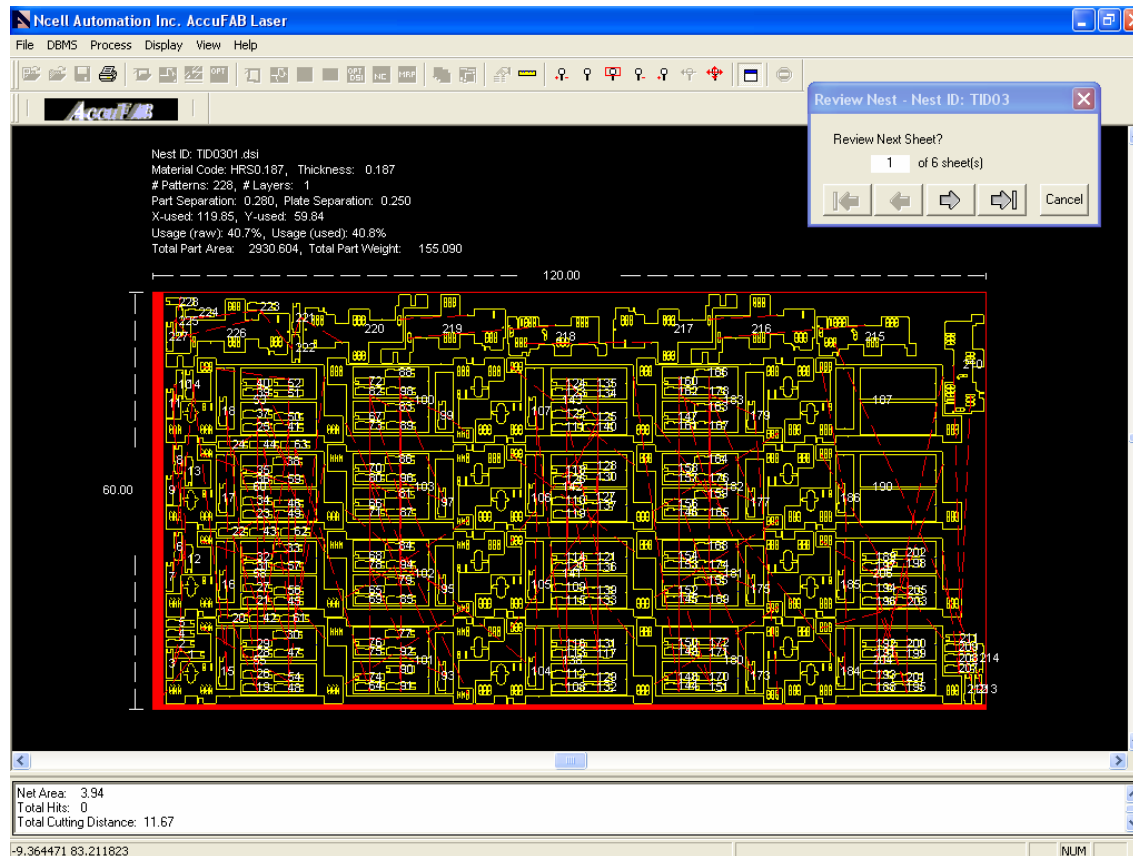
- Our industry is not training enough of the skilled operators that is required, and in order to succeed indefinitely . . . We must reduce our dependence on such operators.
- With automation, no longer do we need a “sheet metal operator,” but a fresh ME graduate will do, same with operation.

Increased Production Hours

- For a company like hours that does not run a 3rd shift, and as a general rule, does not run over the weekends . . . An automated machine allows for overnight and weekend production without the overhead of a supervisor, operator, or even lights!

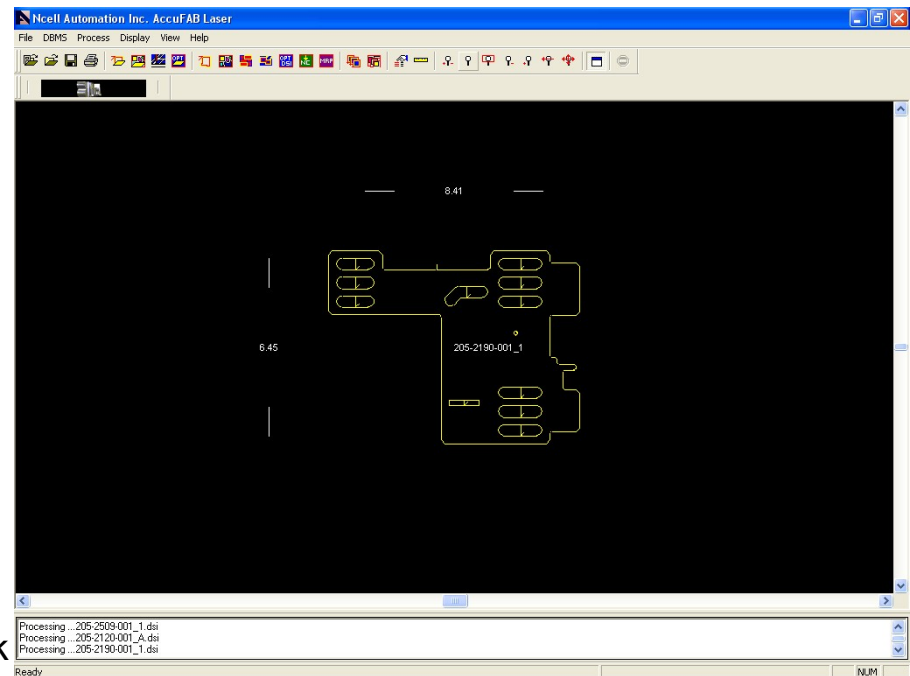
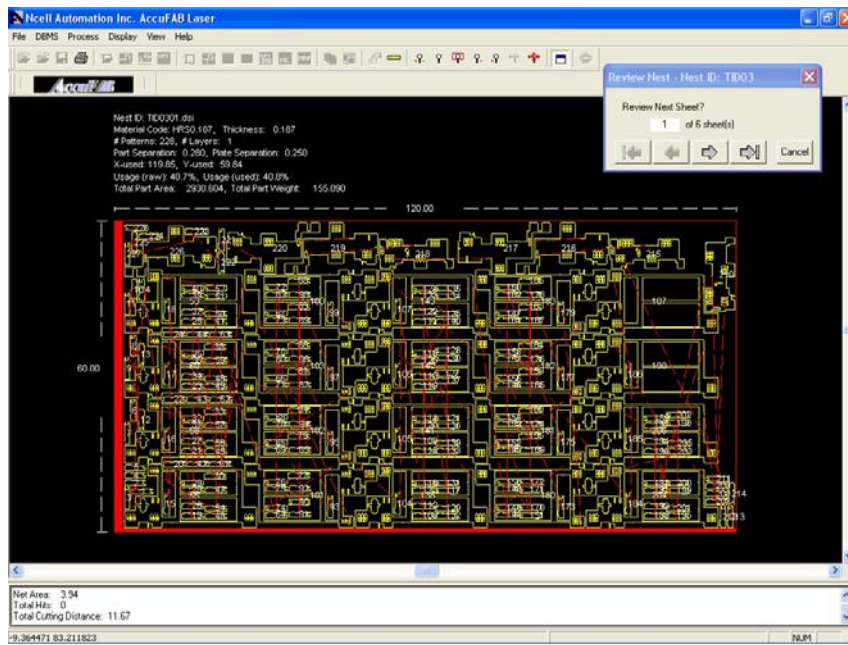
But Even That's Not Enough . . .

- Proper software can exponentially increase the benefits reaped by automation.



Nesting & Laser Control Software

- We were not new to advanced software, etc. However, bundled with automation, a proper software setup changed the entire way we processed flatwork.



The Old Way . . .

- Complete CAD Work (Flat Patterns, etc.)
- Manually Apply Laser Path w/ CAM Software (For Each Job).
- Shear Large Sheets into Manageable Blanks to Size for the Job.
- Setup & Run Laser
- Manually Unload Completed Blanks While Reloading Fresh Blanks.

The New Way . . .

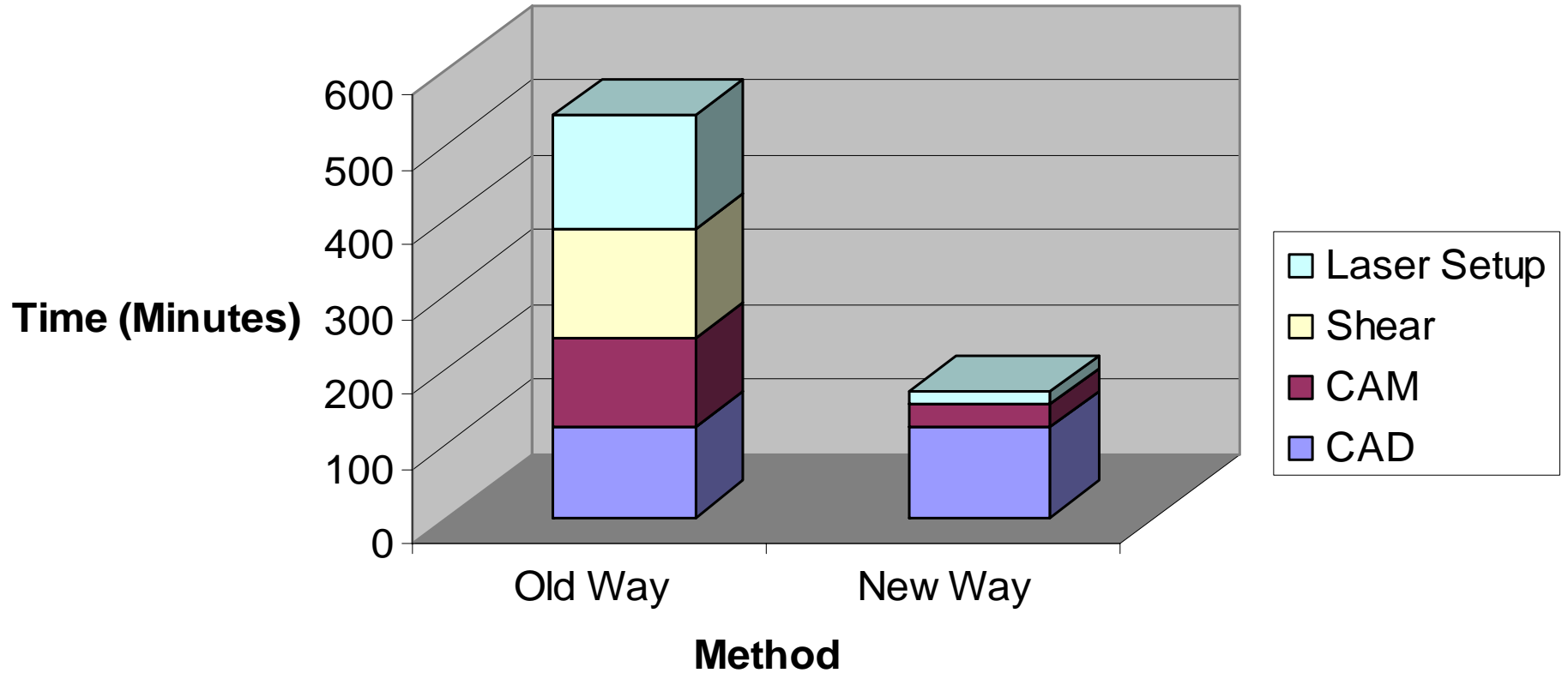
- Complete CAD Work (Flat Patterns, etc.)
- Create Nests of Parts from Like Materials (Many Jobs At Once).
- Skip Shear Step & Related Logistics, Load Full Sheets into Automated Laser.
- Setup & Run Laser.
- Break Out, Sort Finished Parts After Completion.

A Real Job Example

- We'll use an example of only a 2 full sheet nest with 8 different part numbers.
- Engineering: Time Laying Manual Laser Path via CAM Software is Saved.
- Shear Time (& Logistics) Completely Eliminated (8 Setups, No More Shearing Blanks for Jobs).
- Only 1 Laser Setup Required, 7 Laser Setups Eliminated.

Flatwork Processing Time

Time Required for Sample Job w/ 8 Part Numbers



Concrete Results Observed

- We've observed extremely concrete and positive results from the addition of automated equipment and software into our shop.
- We plan on exploring automation in many other areas of production other than just the laser, but we need automation that will work with our high mix, low volume job shop . . . Which is why current welding, forming, and hardware insertion automation solutions are not yet viable.