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How to Make Roll Forming Your Cost-Effective Parts Manufacturing Process





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Roll forming has become a common manufacturing operation because it's a proven method to save time and money, while shortening cycle times on large production volumes. With tight tolerances and increased reliability, cold rolling of components can help meet a wide range of lengths, shapes and piercing patterns.



The roll forming process offers a variety of benefits for mid-sized and large orders including:

- Improved dimensional consistency and uniformity
- Closer tolerances
- Increased strength and structural rigidity
- Inclusion of processes such as perforation, notching and punching
- Reduction in overall labor and material handling
- Options for thin walls on hollow and semi-hollow materials

The benefits of roll forming are best achieved when you consider the production process itself. Knowing how roll forming is used can help you estimate the cost of your next project. To help you understand and control for cost, let's look at the most important pricing features for any roll forming parts creation.

The 3 Biggest Factors Impacting Roll Forming Costs

Controlling lead times and production costs is a top consideration for all manufacturing projects. With roll forming, it becomes more complex than simply designing a process that minimizes the number of passes in the roll set. Design can play a major role in reducing your lead times when it removes secondary operations, or

allows for additional operations to be incorporated into the roll forming cell.

The main factors of design that impact your cost and time are geometry, length, and materials; and each has its own unique set of considerations.

PROFILE GEOMETRY

For roll forming to be cost-effective, you first need to consider the product you want made. A number of elements can help you determine this effectiveness or the associated cost, and first among them is profile geometry.

Complexity

As shapes become more complex, roll forming normally requires additional forming passes because more bending operations are needed. Often, additional fixtures are required to hold rolls, allowing roll tooling to control the bending process in areas where there is normally no access. Specialized machinery is often used for complex parts because of the high number of bending passes needed.

However, the number of bends in a profile is not always proportional to the production tooling costs. We can work with you to design profiles with shallow steps or ribs to allow for a smarter, more economical design solution.

Notching

Notches and holes in the finished product must be taken into consideration in the design stage.



The number and location of holes can affect the cycle time of the process and also the integrity of the product. The roll design will normally incorporate additional roll passes to limit the amount of strain and stress placed on the part during the manufacturing process.

Gauge Use

Many product offerings require the use of multiple gauges due to differing market demands. This can increase costs because each gauge adds additional roll tooling and spacers into the tool set. Tool set up time normally increases when multiple gauges are incorporated into a “combination tooling set”. There are a number of different strategies available to handle multiple gauge ranges in the design of a set of tools to allow for high quality parts.

Access and Space

Manufacturing tools also need to be able to directly access all of the bends of a part or product. Building this profile through rolling and folding creates a more consistent profile geometry, but requires more space to maneuver. Blind corners may pose a problem because it becomes difficult to control dimensions and require slower processing to avoid air bending.

And don't forget to take the roll forming process into account! Outside legs, 180° hems and other designs may create a wavy section when designed flat.

Adding slight bends or tear-drop shapes in existing curves will help yield a flat outcome.

PART LENGTH

The only major restriction on part length during the roll forming production process is the final logistics process to move your parts through your supply chain. Roll forming is an ideal process for long parts, but part length can increase your time and cost. Longer parts often roll at the same speed as shorter parts. Process time may increase as part length increases for two reasons. The first is removing the part from the end of the line often requires additional manpower or specialized equipment. The second is the yield from each coil decreases as part length increases, thus increasing the number of coil changes during a production run.

To help calculate process cycle time the following equation may be used:

$$\text{Forming time} = [L + n(d)] / V$$

- L is the length of the piece being rolled
- n is the number of forming stands
- d is the distance between forming stands
- V is the velocity of the strip through the rolls



Many roll forming manufacturers can provide these values to help you have a better understanding of your process time and cost.

Additional Length Considerations

If your design includes holes, length can also be a factor as production time may increase. Holes designed in patterns require a more-complex setup of pre-punch dies and feed systems. The complexity increases as product length increases because proper support must be maintained to ensure punches down the entire length of the part meet the specified quality tolerances.

Roll forming is a viable, cost effective option for long parts that cannot be fabricated through extruding, press braking, stamping or other processes.

MATERIALS BEING USED

Roll forming has continued to evolve over the years to become a very scientific process.

As a result, many different types of materials are now being formed. The type of material being used will be an important factor in the design of tools. The stress, strain and spring back of the materials must all be taken into consideration in the design. Higher strength materials increase lead times as the debug phase of a product introduction increases. Also expect capital costs to increase with more exotic materials.

These additional upfront costs are often justified on more competitive piece prices.

Another important material consideration is weight. Lighter materials are often suggested for roll forming of complex parts or when there is some room in design. For example, crafting a closed shape with a lighter material can often yield the same strength as an open shape made with a heavier material, but at a reduced overall cost.

Material selection and availability are as important a consideration as what performs well with your design. Overall cost is based on these three factors.

Picking a Smart Partner

Cargowall has been providing roll forming services for more than 20 years, with custom development for simple and complex parts. Whether you need a full design service or have an existing part you need created at a high production volume, the 12 roll forming lines from Cargowall can support your demands.

Our skilled engineers have worked with a wide range of materials at varying lengths, widths, thicknesses, and unique angles. We'll gladly walk you through the entire process with cost estimates and technical solutions that deliver the product you need while considering your budget and goals.