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MARRIAGE, WAR, AND GEAR HOLDING

by Ann Pettibone: CEO, Drewco Corporation

How to get the best results when purchasing workholding fixtures for gear manufacturing.

Just as it is with most things in life—including marriage and military operations—both clear communications and the collection of the right information are essential to getting maximum results.

To create a perfect union between our company and our customers, and to fight the good fight to produce highly effective gear-holding tooling, Drewco has developed a series of information gathering questions. As the designers and manufacturer of workholding fixtures for 56 years, we have found that the process of asking these questions produces a project definition "funnel effect" that, in turn, creates a highly successful end product.

Each section of questions helps clarify the project in a different way. They facilitate the process of taking our initial conversation with a customer—which often starts out simply with "I need a fixture"—to the end result of creating a tool that meets all the needs of our customer, and also gives them even more than they expected in terms of performance and flexibility.

The initial questions help us give a new customer a ballpark cost estimate, so that they can see if the project they're considering fits their budgetary requirements. They also address one of the most important aspects of gear holding, which is rigidity. Having the correct information from the "machinery specifications" questions (i.e. cutting tool size, or hob size, etc.) is essential to creating the proper rigidity required for high-quality gear cutting. Furthermore, how a company approaches fixture design in the initial stages defines the flexibility and future utilization of the tooling (see *Gear Solutions* July 2003: "Custom Solutions for Workholding Challenges"). By carefully discussing the information customers provide in the "process overview" section, we can often suggest ways they can utilize the same tooling for more than one operation: e.g. both rough and finished runs. This information also lets us discover whether we can design tooling to cover a larger range of part sizes. Designing "up front" can save both project dollars and production costs.

In addition, making sure your workholding supplier asks you these questions, and that you answer them fully, will ensure that everyone is on the same page about the project's size, costs, delivery, and expected performance.

Production Requirements

What are your run quantity requirements? What operations are being performed (i.e. hard turn, hobbing, grinding, shaping)? What surfaces are being machined? Will the gears be automatically or manually loaded? How many gears per fixture do you want to run? Do you plan to cut dry or wet?

Form and Function

Are you manufacturing a new gear, or refixturing one you already produce? If it is an existing gear what improvements would you like to see? Will this be a dedicated fixture or a change over fixture? If there is a change over, how many are there and how often?

Gear Specifics

What class of gear do you want to hold (AGMA standards)? Are there other required tolerances? What's most important, and what are your project's most critical aspects (e.g. run-out requirements, concentricity requirements, surface finish requirements)?

Whole Process Overview

What is the planned sequence of operations? Where in that process is the fixturing being used, green, finished? What is the range of tolerance being presented (really)?

Sometimes the part print we are using for design purposes may call out + or -.005, when a cast part, for example, may in reality be +or- .020. Your workholding supplier can work with this range, but to get the best fixture the first time, the actual part tolerance is important. If it is a rough or cast part are there parting lines?

Machine Specifications

Working envelope? What is the cutting tool /hob size? Are there any other clearance issues? Type of actuation? Is there a drawbar? What does the drawbar connection look like? Is there a spindle? What does the spindle connection look like? What is the tailstock stroke? What is the hob or grinding wheel diameter? Machine table-mounting data ?

Whether you're rallying your forces to win a production war with a hard-to-hold gear family, looking to enhance the marriage of your tooling to your part, or improve your working relationship with your current tooling supplier, utilizing this checklist will deliver optimal results.

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