Choosing the Right Machine Tool.

by Chaneski, Wayne S., published in 'Modern Machine Shop', May 1, 2000

I am frequently asked if there is a simple technique that companies can use to help select the right machine tool. Many find it difficult to obtain unbiased information about machine tools. Obviously, people selling machine tools are skilled at pointing out the advantages of their products over those of the competition and just as skilled at down-playing the limitations inherent in their machines. Marketing brochures can effectively convey machine features and some level of technical performance data, but they do not provide true comparisons with competitive machines.

The best advice I can provide is to use a technique that I have found to be useful when evaluating alternative products (not just machine tools). This technique is simple enough for anyone to use, yet ensures a structured approach to the machine tool selection process. Perhaps even more importantly, the technique ensures the stakeholders (those who have to make the machine tool run) have sufficient input to the decision-making process.

The first step is to meet with everyone who will be involved in running and maintaining the machine tool and develop a list of critical machine requirements**. Shop supervisors, manufacturing engineers, machine operators, setup people and maintenance staff should participate in the development of this list, which may include:**

* size of working "envelope" (depending on the type of machine, this may include characteristics such as table size, tool clearance, chuck size and tool swing)

* tool capacity

* type of toolholders used

* machine horsepower (for cuffing force)

* type of machine control

* compatibility with existing CAM software (or programs already written)

* number of available machining axes (generally between three and five)

Once the list is developed, the next step is to have the group **rank the importance of each of the critical machine requirements**. The objective here is to achieve group consensus, not necessarily unanimous rankings, for each critical machine requirement.

Any ranking scale can be used in this exercise, but generally a scale of 1 to 5 (with 5 being the highest ranking) works well. Ranking the critical requirements helps a company differentiate itself from the "typical" machine tool buyer by assigning more weight to specific machine tool features important in its operation.

Once the ranking of critical requirements has been established, this **information should be loaded into a chart, or spreadsheet, along with the machine tool candidates to be evaluated**. (A spreadsheet is recommended as it simplifies the calculations required and allows some "what if" scenarios.)

Each machine tool candidate is then rated against the ranked critical requirements. Once again, a scale of 1 to 5 is an effective rating method. Multiplying the critical requirement's ranking by the rating of each machine tool results in an overall numeric score for each machine tool alternative.

Developing a numerical score for each machine alternative is the final step in the "objective" phase of the machine tool selection process. However, once you have developed an "objective" ranking, it is reasonable to "subjectively" evaluate the machine tools that have similar overall scores.

Sometimes, certain machine tools just have a feel, or reputation, that people are comfortable with. If an operator has some previous experience with a certain machine tool and likes the way it performed, this is useful information that should be included in the decision making process. However, this "subjective" evaluation should only be performed after the "objective" process has narrowed the field down to two or three strong candidates.

Subjective criteria may help to decide between machine tool alternatives whose overall scores are quite close. However, it would be unrealistic to think that subjective criteria should raise the ranking of a machine tool alternative that lagged significantly behind the others in the objective ranking phase.

The key to any machine tool selection process is getting *all* stakeholders to participate and offer ideas based on their unique perspectives.

The more people that participate in this process, the greater the likelihood that a company will select the best machine tool for its needs.

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