

Zitate zur Prozessfähigkeit

Sinn und Zweck von Prozessfähigkeitswerten

Having said all this one might wonder why we are publishing papers on capability indices at all. One answer is to give those unfortunate enough to have to use capability indices a clear understanding of the assumptions involved and of what the indices are actually measuring. Potential authors are forewarned that having published an entire issue on capability indices does not imply that *JQT* [Anmerkung: *Journal of Quality Technology*] is interested in pursuing that particular topic further. Instead, authors are encouraged to work on new and novel approaches to process capability analysis.

Nelson 1992, p. 175

These seemingly innocuous procedures for determining 'process capability' by a single index were propagated mainly by overzealous customers who viewed them as a panacea for problems of quality improvement.

Rinne & Mittag 1999, S. 31 zitiert Kotz & Johnson 1993, p.1

But when I ask people if they understand what C_{pk} means, I get the deer-in-the-headlights stare accompanied by some vague words about the importance of it being greater than 1.33 for good quality. That helps me understand its appeal.

Aha, C_{pk} is a simple, single number that has market appeal and separates good from bad. It avoids statistical gobbledegook, and its very mention dissuades resistance.

OK, it has its place then. All technologies use jargon as shortcuts, and we all play politics to some extent. Why should we differ here? Because quality is better measured by other KPIs, such as percentage within specification, first run yield, process capability and process performance, the last two speaking volumes toward opportunities for improvement.

C_{pk} might indicate the state of the process, but if you are really interested in process improvement, you want to know both its current state and what it could do if everything went right; that is, its capability. The difference between performance and capability is opportunity, and that drives improvement.

Hare 2007

Consequently, common practices for obtaining an estimate of a process capability index are often so flawed, that the reported numerical value can be meaningless.[...] One has to question any management strategy that directs managers' attention by the extreme values of a set of calculated indices that, individually, may not be

particularly meaningful. Although this practice may be better than nothing, the real issue is whether it is of any value.

Pignatiello & Ramberg 1993, p.92

The intent *[of this article]* is to contribute to the understanding and interpretation of these indices, if one is (unfortunately) required to use them.

Pearn, Kotz & Johnson 1992, p. 216

Prozess-Fähigkeit & Prozess-Stabilität

Limitations of use

The actual capability concept and the corresponding indices are only valid for a process under statistical control.

ISO 22514-1:2016, S. 22

The accepted practice in the automotive industry is to calculate the capability (common cause variation) only after a process has been demonstrated to be in a state of statistical control. These results are used as a basis for prediction of how the process will perform. There is little value in making predictions based on data collected from a process that is not stable and not repeatable over time. Special causes are responsible for changes in shape, spread, or location of a process distribution, and thus can rapidly invalidate prediction about the process. **That is, in order for the various process indices and ratios to be used as predictive tools, the requirement is that the data used to calculate them are gathered from processes that are in a state of statistical control.**

AIAG SPC 2, p. 21

What can be said for unpredictable processes?

Not much.

An unpredictable process is one that has failed to display any reasonable degree of consistency in the past. It is therefore illogical to expect that such a process will spontaneously begin to behave consistently in the future.

Wheeler 2000, p.41

The problems associated with the use of C_p , C_{pk} , and other capability indices are well documented. The process being analyzed must be in statistical control, otherwise the indices are meaningless.

Somerville & Montgomery 1996, p. 305

Unkenntnis oder Nicht-Beachtung von Anwendungsvoraussetzungen Der Einsatz von PFI [Anmerkung: Prozess-Fähigkeits-Indizes] erfolgt in der Praxis häufig schematisch ohne nähere Kenntnisse resp. ohne Beachtung der Anwendungsvoraussetzungen,[...] Wer z. B. einen Fähigkeitsindex für eine Fertigungsprozeß mit instabiler Verteilung des zu verfolgenden Qualitätsmerkmals berechnet (nicht beherrschter Prozess, vgl. Abb. 12/3 b), erhält stets ein nicht interpretierbares und mithin wertloses Ergebnis.

Rinne & Mittag 1999, S. 32

Empfehlungen zum Umgang mit Prozessfähigkeitswerten

They [Anmerkung: Kotz und Lovelace] refer to the mandated use of P_p and P_{pk} through quality standards and industry guidelines as undiluted "statistical terrorism" (i.e. the misuse of statistical methods along with threats and/or intimidation to achieve a business objective).

Montgomery 2012, p.374 zitiert Kotz and Lovelace 1998, Kap. 1

The process performance indices P_p and P_{pk} are actually more than a step backward. They are a waste of engineering and management effort – they tell you nothing. Unless the process is stable (in control), no index is going to carry useful predictive information about process capability or convey any information about future performance.

Montgomery 2012, p.374

We highly recommend against using these indices [Anm.: P_p und P_{pk}] when the process is not in statistical control. Under these conditions, the P-numbers are meaningless with regard to process capability, have no tractable statistical properties, and infer nothing about the long-term capability of the process. Worse still, they provide no motivation to the user-companies to get their processes in control. The P-numbers are a step backwards in the efforts to properly quantify process capability, and a step towards statistical terrorism in its undiluted form.

Kotz and Lovelace 1998, p.253

Far too often, C_{pk} diverts attention from the real issues and compromises process improvement. It is time to question whether it would be wiser to abandon it and concentrate on promoting sound statistical practice.

Gunter 1989, p.87

The basic argument of this article is that existing process capability indices are totally unnecessary in a proper analysis of the capability of a process to produce conforming product.

Kaminsky, Dovich & Burke 1998, p. 445

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