



ELSEVIER

Int. J. Production Economics 64 (2000) 295–309

international journal of  
**production  
economics**

www.elsevier.com/locate/dsw

# Experiences with a concurrent engineering self-assessment tool

Rik Van Landeghem\*

*Department of Industrial Management, University of Gent, Technologiepark 9, B-9052 Gent, Belgium*

---

## Abstract

This paper introduces a quickscan checklist for assessing the adoption level of concurrent engineering (CE) practices within manufacturing companies. The checklist is then used to describe quantitatively CE practice, as surveyed within 46 companies. The paper first introduces the concept of concurrent engineering. Then it describes the main features of the checklist, demonstrating its advantages by comparison to other CE assessment tools. The paper then elaborates on the numerical results of an audit within companies. It seems that CE has a high adoption rate within discrete manufacturing community, but at the same time the use of formal tools and methods is sorely lacking. The paper finally argues that the scoring model: the “% CE compliance”, allows for benchmarking between companies. © 2000 Elsevier Science B.V. All rights reserved.

*Keywords:* Concurrent engineering; Benchmarking; Performance measurement

---

## 1. Concurrent engineering

Most manufacturing companies have seen product life cycles shrink dramatically in the last 10 years. In consumer electronics, new products such as portable CD players or PC printers, typically last for 6–9 months. Automotive industry has seen development cycles reduce from 5–8 years to 36 months and less [1]. This means new products have to be developed and introduced within short and predictable lead times, a notion that has been termed “time-based competition”. Several management books, such as [2], describe these recent trends in detail, illustrated with many examples.

The concurrent engineering (CE) concept has been introduced in 1988 by the US Department of

Defense (DoD), aimed at helping its suppliers to produce better products at lower cost within a shorter time frame. CE introduces concurrency among the different design activities, which until then formed a largely sequential process (see Fig. 1 from [3]). A good working definition of CE has been given by Cleetus [4]:

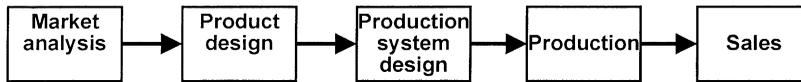
Concurrent Engineering is a systematic approach to the integrated and concurrent development of a product and its related processes, that emphasizes response to customer expectations and embodies team values of cooperation, trust and sharing in such a manner that decision making proceeds with large intervals of parallel working by all life-cycle perspectives, synchronized by comparatively brief exchanges to produce consensus.

CE has since gained its place as one of the major “practices”, along with others such as total quality,

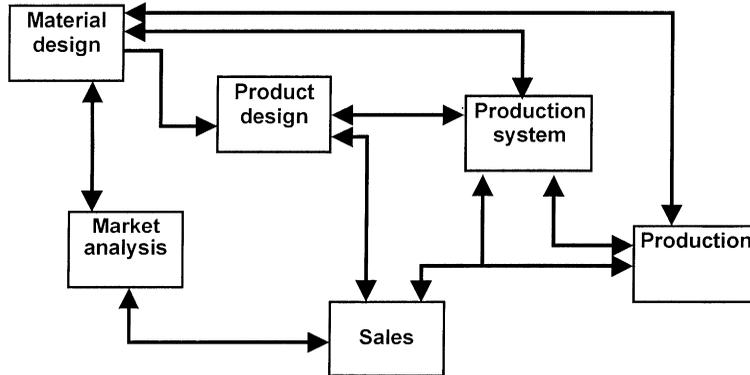
---

\* Tel: + 32 + 9-264-55-02; fax: + 32 + 9-264-58-47.

E-mail address: [hendrick.vanlandeghem@rug.ac.be](mailto:hendrick.vanlandeghem@rug.ac.be) (R.V. Landeghem)



Sequential design: normal relationships, limited feedback, simple to manage.



Simultaneous design of material, product and process, complex to manage.

Fig. 1. Concurrent engineering increases management complexity.

Table 1  
Results derived from implementing CE (based on [7,9])

Objective	Metric	Result	Occurrence (%)
Decreased total lead time	Development time	30–70% less	48
	Time to market	20–90% less	70
Improved design quality	Engineering changes	65–90% less	56
Reduced life-cycle cost	Return on assets	20–120% higher	33
	Manufacturing costs	up to 40% lower	30

logistics and lean production, enabling its adopters to become world class manufacturers. A recent study by Voss et al. [5] has, perhaps for the first time, established the existence of a positive correlation (with  $R^2 = 0.52$ ) between the performance of 665 companies in the marketplace and their use of “best practices”. These best practices were defined as belonging to six major groups, with CE being one of them. The study also showed that the top 10% performance leaders were better than the 10% laggards, in all of these practice groups. The largest gap (73%) was found in the CE practice index. This strongly suggests that companies should adopt CE as one of their practices to obtain lasting competitiveness.

From Fig. 1 and the definition one can already gather that implementing CE is a very difficult management task indeed. Literature is replete with reports of critical success factors and stumbling blocks for achieving true concurrency. These cover all aspects and agents, involved in the development of well-engineered products, including external ones such as suppliers and customers. We refer to [6] for an extensive literature list. Consequently, although results of CE can be impressive, as reported in Table 1, compiled from [7,9], the adoption rate and the completeness of implementation differ markedly between different companies. A recent position paper [8], emerging from the PACE project (Practical Approach to Concurrent

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات