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# OPTIMIZING METAL CUTTING COST BY INTEGRATING OF COST OF QUALITY USING TAGUCHI'S LOSS FUNCTION

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## ABSTRACT

*The metal cutting is one of the most basic and common operations in manufacturing industries. The quality of final product depends largely upon the control of metal cutting operations performed on its components. There are many characteristics of the machined components which directly contribute to the product quality. These characteristics may include dimensional accuracy, surface finish, roundness, etc. Most of the characteristics of a work-piece are the function of machine-tool and cutting-tool condition, cutting parameters, material of the tool and work-piece, and worker training. The production planners generally don't have control over the material of the work-piece and condition of machine-tool. The worker training problems are addressed separately based upon the availability, time, learning curve issues, etc. However, the cutting parameters are totally controlled by the production planner. Therefore, the selection of the cutting parameters becomes a critical issue to control the quality. The selection of the cutting parameters is mainly dependent on the economics of metal cutting operations. However, traditionally these economic models do not include the quality related cost. Even though, some recent attempts have been made to include quality issues in the tool economics models cutting parameters but the relationship between the surface roughness and cutting parameters has not been explored extensively. This paper is an attempt to develop a model to include surface roughness into the tool-economics model to select cutting parameters using Taguchi's loss function approach.*

# RECENT PRACTICES AND TRENDS WITHIN OPERATIONS MANAGEMENT TOPICS & METHODOLOGIES

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## ABSTRACT

*The methodologies and topics employed within the discipline of POM (Production & Operations Management) appear to be under metamorphosis.*

*Since the early 1990s, the nature of POM methodologies has become an increasing topic of interest after Meredith, et. al. (Meredith, Raturi, Amoako-Gyampah, & Kaplan, 1989), Flynn et. al. (Flynn, Sakakibara, Schroeder, Bates, & Flynn, 1990), Swamidass (Swamidass, 1991) and others argued that POM research, given its Management Science / Operations Research roots, relied far too heavily upon deductive, quantitative methods such as simulation. In general, all of these authors argued for the need to move POM research toward the empirical realm and its associated methodologies. This theme continued through the 1990s literature in the form of calls for additional POM case study research (Meredith & Samson, 2001; Meredith, 1998), POM case study primers (McCutcheon & Meredith, 1993; Stuart, McCutcheon, Handfield, McLachlin, & Samson, 2002), an assessment of empirical methods recently employed in POM research (Scudder & Hill, 1998), a similar assessment of POM survey-based research (Malhotra & Grover, 1998) as well as several articles discussing the theory-building aspects of empirical research (Amundson, 1998; Handfield & Melnyk, 1998; Melnyk & Handfield, 1998; Wacker, 1998). Yet only one 1999 paper has actually investigated POM methodology (Pannirselvam, Ferguson, Ash, & Siferd, 1999).*

*The types of topics pursued is also an area of interest and much informal discussion among POM faculty, as they seek to understand the new direction their discipline is taking; there is much speculation regarding whether a number of topical areas (e.g., supply chain management, enterprise resource planning, global operations, logistics and quality) have sufficiently evolved to merit curricular changes or even mutually exclusive disciplines. A 1980 article (Chase, 1980) formally studies historical POM topics and makes recommendations regarding future research. Little work of this type has been done in the quarter century since then. A 1990 study classified and tallied POM dissertations by topic (Meredith & Amoako-Gyampah, 1990), a 1999 study investigated POM topics (Pannirselvam et al., 1999), a 2000 article examined the frequency of articles regarding global/international operations management.(Prasad & Babbar, 2000), and a work-in-progress regarding the surveying of POM faculty on topical coverage was presented at a national conference (Cook & Heiser, 2001).*

*In the interest of contributing discipline knowledge to the discipline in these areas, 217 articles from the discipline's leading journal spanning the period 1993-2000 were coded for methodology and topic. The resulting data evidences practices and trends in POM methodologies and topics over the period studied.*

*References available on request.*

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