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Preface

The machine tool engineering technology can be, in wider scope, twofold: one is the production technology consisting of the design and manufacture, and the other is the utilisation technology. Importantly, the majority of people of machine tool concerns are interested in and related to the utilisation technology; however, the matters in production technology concerns are generally at issue especially in the academia, because the machine tool underpins all the industrial sectors as represented by a famous maxim, i.e. "*Only the Real Industrial Nations Can Produce the Machine Tool and Ordnance*". In fact, we cannot produce the necessary components for all the commercial and defence supplies without having the machine tool.

In use of the machine tool, we need, in principle, the synergic knowledge ranging from the form-generating movements possible by, and also structural design and numerical control of the machine tool, through the attachment and tool, to the machining technology. It is, however, regrettable that we cannot obtain the preferable materials enabling such knowledge to be learnt at glance. In fact, all the books having been and being publicised deal with each subject mentioned above separately with narrower scope.

As a result, it appears that the machine tool and cutting/grinding technologies belong to another engineering sphere each other. For example, we can observe one of the serious problems in the self-excited chatter vibration of regenerative type. In short, to suppress the chatter vibration, we must consider the corresponding problem related to the machine-attachment-tool-work system. It is, however, worth suggesting that nearly all academic, engineering and technical reports on the chatter vibration do not state anything about the chuck and tool holder, although they play very important roles in the suppression of the chatter vibration.

In this context, we have experienced a similar story in the thermal deformation, and importantly, we must be aware of the necessity of establishing such a new viewpoint even in the machining technology with the advance of the tool and attachment. In short, we can find a considerable number of novel cutting tools, which may innovate more process planning than ever before; however, for their effective uses, we need to establish also the innovative attachment to hold them. For example, it has been the common sense to hand-lap the sharp cutting edge