

DEVELOPMENT OF 'STANDARD FMIND' AS AN INDEX  
OF  
PERCEPTUAL MOTOR LOAD

BY

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**For their very personal association and  
everlasting memories this thesis is  
dedicated to**

Late Prof. R. MISHRA

and

Late Prof. B. KARUNES

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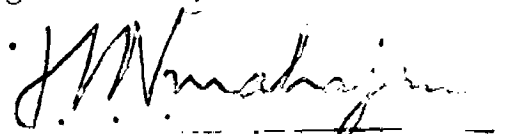
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(ii)

SYNOPSIS

Increased involvement of both senses and the central nervous system in industrial jobs has subjected man to a greater amount of mental stresses and strains, resulting in additional mental load or perceptual motor load. This demands the development of suitable methods for measuring perceptual motor load similar to measuring physical load. The literature reviewed in Chapter-2 of this study provides a summary of various methods and approaches used so far in the measurement of this load, their applications and limitations. Out of these the quantitative approach given by Michon (1964 and 1966), using Interval Production Task (Simple foot tapping) as the secondary task, prima facie, appears to be the most promising and quite useful since this gives quantitative evaluation of perceptual motor load involved in the performance of different primary task. The irregularities created in the performance of Interval Production Task under the dual task performance system is taken as the measure of the difficulty of the primary task. This present study is an extension of this approach. It is carried-out on three major accounts, viz., (1) Testing the validity of Michon's approach and hypotheses, (2) Developing the new index 'STANDARD FMIND', and (3) Providing some practical applications of 'STANDARD FMIND'.

In the first place, the results of experiments in both paced and unpaced conditions and the conclusions drawn, on the basis of different parametric and non-parametric analyses, have verified the validity of Michon's quantitative

approach and different hypotheses in the measurement of the perceptual motor load. Further, an important prediction, which can be made on the basis of this study, is that similar performances can be possible under the unpaced and the paced (when set at subject's unpaced mean feed rate) conditions, as long as the nature of job remains constant. The number of misses, if any, under the paced condition does not necessarily show deterioration in the performance of the job, and their occurrence could be due to the presence of some foreign elements during the immediate preceding work cycle or cycles.

In the second place the major contribution in this study has been the development of a new index called 'STANDARD FMIND' in place of Michon's Irregularity Index (MII) for measuring perceptual motor load. It has been shown that the new index, which is a function of three important factors, viz., (i) coefficient of variation of tapping time ( $C.V.[t_i]$ ), (ii) factor  $(1-r_1)$ , where  $r_1$  is the first auto-correlation coefficient and itself varying between +1 to -1, and (iii) mean tapping rate ( $\bar{R}$ ), is not statistically different from MII, but at the same time it is simple to understand, more suitable for application and quite free from various shortcomings inherent in MII.

Thirdly, this study deals with some practical applications of the new index. The first area of application

is in studying human behaviour in the process of learning new jobs. It has been suggested that the occurrence of an inflected P.M.L. score curve and the trend of its slope could be attributed to the aptitude of a person for a given job, and the relative slope values of P.M.L. score curves for different people in the job could be used for ranking them for selection purposes. Further, it has also been shown that P.M.L. Score measures job difficulty or job complexity and thus can be used in job classifications, etc. The second area of application dealt with has been to test (by way of more experiments) the validity of the hypothesis, suggested earlier, that similar performances are possible under the unpaced and paced (when set at subject's unpaced mean feed rate) conditions, as long as the nature of the job remains constant. More or less, positive support to this hypothesis has been established from these experiments.

Finally, the main conclusions have been summarised and a line of approach for future studies has been suggested.

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