

respectively, then the overall performance score of the subject is calculated as follows. For his response in the discrimination test according to the DL LUT, the subject receives a Tired rating, while, in a similar manner, for his response in the cognitive test according to the CT LUT, the subject receives a Tired rating. Hence, on referring to Overall Score LUT, then the overall score of the subject for the second alertness test is "Tired" and the time of the next test is 2 minutes. The results and the time of the test are stored in memory 130.

Hence, it can be readily appreciated that due to the deterioration of the state of alertness of the subject from a Suspect rating to a Tired rating, control apparatus 106 preferably adjusts the period of time between tests from 3.5 minutes to 2 minutes, thereby placing the state of alertness of the subject under more intense scrutiny and therefore improving the state of alertness of the subject.

While the invention has been described with respect to a limited number of embodiments, it will be appreciated that many variations, modifications and other applications of the invention may be made.

What is claimed is:

1. Apparatus for monitoring and improving the alertness of a subject while the subject is performing a primary activity, the apparatus comprising:

- (a) first stimulation means for providing at least one discrimination level test stimulus of increasing intensity to the subject;
- (b) first response means operable by the subject for responding to said at least one discrimination level test stimulus;
- (c) second stimulation means for providing at least one cognitive test stimulus to a subject while the subject continues to perform the primary activity, said second stimulation means being responsive to an intensity level of said discrimination level test and to said first response means to set an intensity level of said cognitive test stimulus,
- (d) second response means operable by the subject for responding to said at least one cognitive test stimulus; and

(e) control means for controlling the rate of activation of at least one of said stimulation means such that its rate of activation increases inversely with a deteriorating state of alertness of the subject so as to improve the alertness of the subject.

2. Apparatus as in claim 1, wherein each of said stimulation means includes one selected from the following group: a loudspeaker for providing an audible stimulus; a capsule speaker for providing an audible stimulus; a vibrator for providing a tactile stimulus; and a light emitting device for providing a visual stimulus.

3. Apparatus as in claim 1, wherein said first stimulation means includes said second stimulation means.

4. Apparatus as in claim 1, wherein said discrimination level test stimulus includes one selected from the following group: a signal of increasing intensity; a pair of signals of substantially the same intensity; a signal having a variable rate of increase in intensity; and a signal having a variable initial intensity.

5. Apparatus as in claim 1, wherein said cognitive test stimulus includes one selected from the following group: at least two signals of different frequencies; at least two signals of different intensities; at least three signals where the interval between two consecutive signals is different; and at least two signals of different pulse width.

6. Apparatus as in claim 1, wherein each of said stimulation means is fashioned as one selected from the following group: a hand-held portable device; a wristwatch; a behind-the-ear clip; a pair of spectacles; and an attachment on a steering wheel.

7. Apparatus as in claim 1, wherein each of said response means includes one selected from the following group: a pad and a microphone.

8. Apparatus as in claim 1, wherein said first response means includes said second response means.

9. Apparatus as in claim 1, wherein each of said response means is fashioned as one selected from the following group: a hand-held portable device; a wristwatch; and an attachment on a steering wheel.

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