

Integrated Workload Scale (IWS)

Instructions and Guidance

Purpose of the Tool

The IWS collects real time perceptions of signaller workload based on a nine-point scale. This tool can be used to identify peaks and troughs in the effort and demand experienced by signallers when responding to dynamically changing work conditions. If it is used in conjunction with video recording, subject matter expert commentary or the Activity Analysis Tool (AAT), it will assist in highlighting which combinations of tasks or situations are considered to produce high and low levels of effort and demand (workload).

Using the Tool

There are four ways of applying IWS:

1. Keypad input device
2. Touch screen laptop
3. Paper and pencil
4. Actiwatch

For the keypad and touch screen laptop read 'Getting started with the IWS tool' booklet to understand how to load the IWS software. The ergonomics team at Network Rail holds both of these input devices. This team should also be consulted about use of the Actiwatch.

For the paper and pencil application use the stopwatch and the laminated IWS scale provided and record data onto your notepad in two columns. The first column should be for a record of the time a rating is obtained, the second the rating provided. To assist in the recording of ratings numbers 1 to 9 can be used to represent each descriptor, with 1 representing 'Not demanding' and 9 'Work too demanding', see table below for example.

Time Recorded	IWS Rating
10.05	3
10.10	3
10.15	4
10.20	3

The IWS can be applied both in the field and in simulated signalling environments.

The tool is used by asking signallers to provide a rating of their workload at a suitable time interval over a particular period of time within a shift for a specified duration. The time interval considered acceptable in the field is 5 minutes. The period of time chosen will depend on the workload issue under investigation and may include a particular scenario e.g. possessions or use of level crossings. The time chosen must characterise the workload to be investigated. The duration that the IWS is applied over depends on the period considered necessary to provide a good representation of the situation to be investigated. The recommended duration during field assessments is one hour. For all input devices:

- provide the signaller with enough time to become familiar with IWS scale descriptors and the input device before starting recording.
- ensure they understand the time intervals at which they will be required to provide a workload rating.
- reinforce the fact that the application of this tool can be abandoned at any time during their work. The signaller should never prioritise providing a rating over and above their signalling duties.
- when synchronizing the IWS rating with video recordings, verbal prompts should be timed with the clock on the video camera.

- if ratings are omitted it is suggested that either a zero or the value of the last rating received be entered to ensure sufficient data points for any analysis. Alternatively the signaller could be asked to provide a rating retrospectively.

Data management

The 'Getting started with the IWS tool' booklet explains where to find the excel spread sheet 'to create IWS Graphs from IWS data v3.0'. This can be transferred onto any computer and used for data collected from all input devices. Instructions on how to use this spread sheet are contained within the first worksheet.

The output from this tool is a graph that highlights peaks and troughs in workload experienced. This can be presented in parallel with the AAT data on a graph or by reviewing video recordings to understand the types and combinations of activities, which may influence the peaks and troughs. Debriefing with signallers will increase the richness of the data and the level of diagnostic insight that can be obtained. Calculating the mode or frequency with which each rating was selected over a period of time will reflect the most frequently scored rating.

A rating of 4 or more may suggest that the system and working environment is or is about to demand considerable effort from the signaller. This may be sufficient to cause observable deterioration in signallers completing all activities required of them within the necessary time available.

Trials have not been completed for extended periods of **low** levels of workload. However, if a system consistently rates '1' for an extended period of time this should also be considered as likely to impact on their concentration and potentially impair performance.

All data and findings obtained in using the IWS should be reported to Network Rail, Ergonomics Team via **emma.lowe@networkrail.co.uk**.

Limitations

The strength of the IWS lies in its ability to quickly and effectively provide data, which can be compared from minute to minute if necessary, from situation to situation or even between individuals. However, it does not differentiate between the different dimensions that are the essence of the multi-factorial concept of workload.

One risk is that inappropriate interpretations are made from the data. This includes calculations of a 'mean workload score;' as this may not represent the dynamic nature or multiple dimensions of workload and misleading conclusions could potentially be drawn. Another risk with any self-report rating data is that unwarranted confidence is invested in the data produced as they appear quantitative but remain fundamentally subjective.