

# task analysis

## Taking the work out of task analysis

Task analysis has long been a tool in every ergonomist's toolbox, providing a way to effectively perform one of the fundamental steps in any ergonomic intervention – the documentation of the user's activities. Task analysis has become a required activity in the development of safety critical systems, serves as the backbone technique in the development of training and documentation, and is used as the foundation of human-computer interface design.

Task analysis is a structured means of solving the problem of how to rigorously analyse and document operations. It aims to highlight the key aspects of users' tasks so that they can be addressed by the full range of human factors techniques. It seems that as many approaches to task analysis have been developed as there are analysts. And this is fitting, because task analysis is an expression of how individual ergonomists apply their wealth of experience to perceive and understand the user's actions.

Since the initial development of Hierarchical Task Analysis (HTA) in the late 1960s, HTA has been the method of choice for ergonomists across a wide range of industries in the UK and North America. It has been described as the generic approach to task analysis, often used in the first stages of a project before more specialised tools are applied. In recognition of the continuing success of the HTA approach, a number of books and papers were recently published to restate and clarify this approach to task analysis.

The key elements of HTA are:

### *The task name*

The focus of any HTA analysis is to clearly describe what the user intends to do. HTA then successively breaks down the task being analysed into a series of goals and sub-goals (for the sake of simplicity, it is easier to refer to this process as breaking tasks into sub-tasks of successively smaller levels of granularity). Task names are concise statements of the user's actions that must occur to complete the task in question. The format is "verb-object-qualifier", such as "open the valve half way".

### *The location of the task in the hierarchy*

This records how the successive levels of sub-tasks are related. For instance, task 1 is broken into its sub-component tasks 1.1, 1.2 and 1.3. The relationships between sub-tasks are shown by the task numbering and either an indented list, tables or a diagram of the task hierarchy. The method used to display this information is normally selected in order to make communication with the subject matter experts and recipients of the analysis as easy as possible.

### *The plan*

The plan describes how the sub-tasks are carried out in order to reach the user's goal. For instance: "if x, do 1, 2, then 4 but if y, do 1, 2 then 3".

### *Task details*

This is the information about each task that the analyst has decided to record in order to help them make later design decisions. Examples of task details are: the time it takes to complete a task, the likelihood of error, or the skills required in order to carry out a task.

Andrew Shepherd's book *Hierarchical Task Analysis* (2001, Taylor and Francis, ISBN 074840838X) and John Annett's recent book chapter ('Hierarchical Task Analysis' in the *Handbook of Cognitive Task Design*, edited by Erik Hollnagel, Lawrence Erlbaum Associates, 2003) provide a comprehensive guide to this approach to task analysis. Issues such as how to decompose complex operations, what information to collect, and the level of detail required for the analysis are described and illustrated with many examples.

However, HTA has had a considerable overhead in terms of creating the diagrams of the task relationships and keeping the task lists and diagrams synchronised as the analysis evolves. Fortunately, software support is now available to help take the work out of task analysis. *TaskArchitect* enables the analyst to concentrate on the content of the analysis rather than the mechanics of managing the data, making it easier to rapidly iterate an analysis and develop task analysis skills.

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## Australian health industry guidelines

Copies of Australia's health industry guidelines on 'Designing the Work Environment', 'Selection, Design or Redesign of Equipment' and 'Selection of Wheels and Castors', have been incorporated in the *Manual Handling Guide for Nurses* (NSW Nurses Association and WorkCover NSW, 1998). This is available free on the internet at [www.workcover.nsw.gov.au/Publications/OHS/ManualHandling/nursesmh.htm](http://www.workcover.nsw.gov.au/Publications/OHS/ManualHandling/nursesmh.htm).

The new Australian Design 4 Health website can now be found at [www.dir.qld.gov.au/design4health/index.htm](http://www.dir.qld.gov.au/design4health/index.htm).

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