

WHITE PAPER

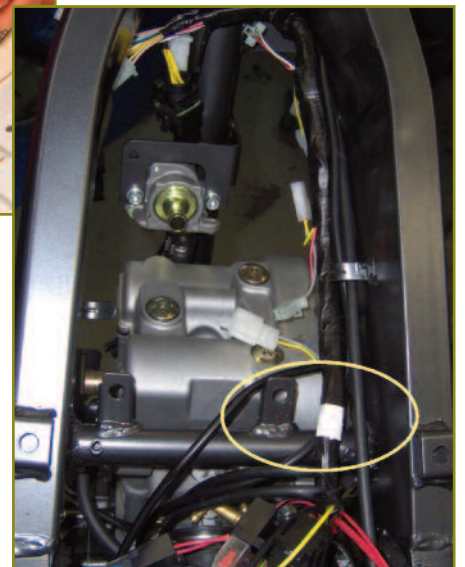
WORK INSTRUCTIONS A BASIC INTRODUCTION

WHAT ARE WORK INSTRUCTIONS?

Work instructions are exactly what they suggest. They are a detailed list of steps required to be carried out in order to produce a desired outcome for a piece of work. A common everyday example of a work instruction is a recipe where the ingredients required to make a meal are listed along with details of quantities, preparation methods, equipment needed, timings and temperature settings. Another easily understood example are the assembly instructions found in flat-pack products where the parts are itemised, quantities defined, the order of assembly and the tools needed are described. Typically these work instructions will include a combination of written text, diagrams and photographs describing and showing how to complete the task.

In this paper we focus on work instructions used in industrial manufacturing environments however their basic purpose and intent are exactly the same as the examples previously described.

THIS WHITE PAPER TAKES A HIGH LEVEL LOOK AT WORK INSTRUCTION SOLUTIONS



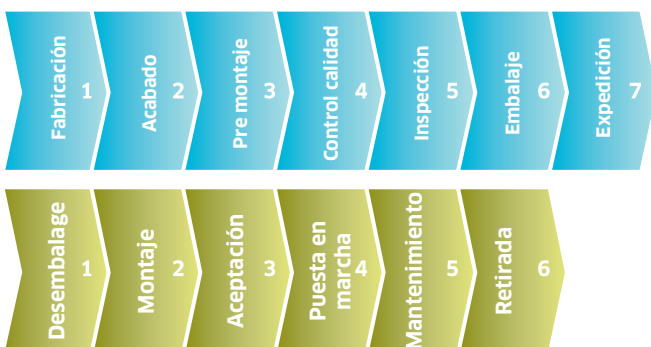
(1) Recipe
(1) Flat-pack Assembly
(2) Industrial Work Instruction

WHO USES THEM AND HOW?

Usage of work instruction sheets is extensive and covers a diverse set of industries that include:

- Machine tool manufacturers
- Component manufacturers
- Automotive manufacturers
- Special vehicle manufacturers
- Aerospace manufacturers
- Defence and weapons manufacturers
- Industrial machinery manufacturers
- Materials handling manufacturers
- Utility companies
- Building and construction companies
- Pharmaceutical companies
- Shipbuilders
- Service and maintenance organisations
- Consumer products
- Scientific equipment

Types of workflow activities where opportunities for work instruction systems exist within industry



(1) Work instructions for work-cell

WHAT DO WORK INSTRUCTION SYSTEMS PROVIDE?

Today most computer based work instruction systems use standard Web based browsers to retrieve data and documents held on remote server based database systems. Multiple types of information can be combined and accessed including CAD drawings, 3D models, data sheets and video simulations. On-line availability of all pertinent and up-to-date documentation and instructions improves shop floor productivity, the quality of work and operator efficiency. Most work instruction systems provide a number of functional modules that can include:

Editor

Capability to allow planners and engineers to create text, add images and include hyperlinks to many different file types including: graphics, movies, 3D models, text documents and spreadsheets. Using the editor, engineers can develop information about activities, components, resources and shop floor work cells.

Database

Stores and keeps track of all work instruction data in one place. This reduces data duplication and means that activities can be defined once then reused as required across multiple product lines. Having a centralised database repository also ensures that the latest versions of data are used.

Publishing

Function that combines instructions and related files according to the task sequence specified by the engineering when the work instruction was created (see editor). Standard templates are also provided to ensure that information is presented using an agreed format and style. Once compiled the data can be published as the latest revision for either viewing electronically or for printing and paper distribution if preferred. A full history of revisions is automatically maintained for auditing and reference purposes.

Viewer

Allow engineers and operators access to work instructions and associated data files from shop floor based terminals or remote access computing devices using a standard Web browser. Inputting a process step or part number enables the operator to access all related published information. Interactive model investigation and viewing audio-visual information is available from the mobile computing devices to assist the operator wherever they are located.

FEATURES

- What-you-see-is-what-you-get (WYSIWYG) editing
- Work instructions definitions for:
 - Parts & assemblies
 - Operations
 - Activities
 - Locations
 - Resources
- Multi-media support for: images, video, text, spreadsheets & 3D models
- Style templates defining information layout and presentation
- Web based distribution of work instructions or printed documents (if required)
- Standalone operation or can be integrated with ERP, PDM and/or PLM systems
- Archive and audit support
- Barcode and mobile communications support

WHAT ARE THE BENEFITS OF WORK INSTRUCTION SYSTEMS?

- Reduces the time to create and update documentation
- Provides the ability to track work instruction changes
- Reduces the time required by staff to learn new work operations as all information is immediately available in multiple formats
- Increases productivity through fast access to up-to-date information
- Process efficiency gains through automated work instruction generation and distribution
- Quality improvements through the availability of standard, consistent and up-to-date information
- Better communications between engineers and shop floor reduces delays and errors
- Removes the need to rewrite documentation by allowing reuse of existing texts and data
- Operators do not waste time looking for supporting documentation required to do the work
- Improved readability, accuracy and consistency of information reduces time and errors
- Leverages existing product data to ensure correct versions of data are available



(2) Remote access to information
(1) Applicable to different industries

WHAT ARE THE CURRENT TRENDS IN THE INDUSTRY?

Work instruction systems have continued to evolve from their early beginnings when materials requirements and enterprise resource planning (MRP/ERP) vendors first provided computer based solutions as part of their complex yet comprehensive offerings to major manufacturing companies. However, today many medium to small enterprises (SMEs) still use inefficient paper based work instruction processes. Opportunities now present themselves for the adoption of standalone work instruction solutions that are low cost, easy to use and that take advantage of Web multi-media content delivery. The increase in offshore manufacturing by many companies has seen the rise in the need for manufacturing planning systems that can interoperate with different suppliers' systems across the world.

Standalone work instruction solutions with the capability of integrating with third party manufacturing ERP solutions, product data management (PDM) systems, product life cycle management offerings (PLM) and workflow engines are now in high demand. Adoption of Web based document mark-up languages, such as XML, that allow complete flexibility and control over document structure, layout, style and content is now common. These technologies provide the ability to deliver text, images, video and sound within the context of a work instruction document. Adoption of internet and wireless connections to terminals located at work centres or available to mobile operators provides direct access to remotely held product data. Productivity and quality benefits are fully embraced by stand-alone and integrated work instruction solutions that deliver complete, accurate and timely information to where it is needed.



[1] [2] Applicable to different industries

TRENDS

Move towards stand alone systems

- Ability to integrate to third-party manufacturing (ERP) and product data management (PDM) systems
- Interoperability with workflow systems enabling work instructions to be triggered at each step on the workflow process
- Web based delivery of multi-media and multi format data including:
 - Routings
 - Bill-of-materials (BOM)
 - Orders
 - Specifications
 - Standards
 - 2D drawing,
 - 3D models
- Adoption of Web standards such as XML enabling hybrid documents that combine text, data, video and sound to be created.

WHAT PROPOSES KRONTIME ?

KRONTIME is dedicated to delivering its visions of providing effective answers to the complex problems of managing and improving production times, processes and manufacturing work methods. Our first priority is to deliver high quality software applications to our clients to help them optimise resources and achieve maximum benefits. Our Krontime application suite has a long and proven track record of delivering significant business benefits to our clients across the world. We continue to invest in the latest technologies to ensure our products offer the most competitive solutions to industry - enabling our customers to improve their manufacturing operations. Krontime is used by our clients in many different sectors that include: automobile supply chain, motorcycle manufacture, manufacturing automation, electronics, textile, household electrical products, construction and many more. We provide international coverage for our customers in Spain, Portugal, Poland, Czech Republic, Austria, Brazil ...

Picture references:

[1] Fotolia

[2] Derbi