



Documenting factory skills

A graphical technique

Patrick Onions, 2012

In 2012 The Knowledge Studio were asked to suggest ways to optimise the manufacturing of timber products at a local factory. One of the improvement areas identified was skills transfer, particularly relevant in this business where production and the labour force were seasonal.

Factory workers at this plant perform a variety of roles, moving every so often from one workstation to another. The team possess the necessary skills but overall production was variable, performance differed from person to person, and changeovers were slow until the operator re-acquired the knack and the rhythm.

In these types of situations, traditional training and formal techniques can be unsuitable. Wordy manuals are too verbose, quite inappropriate in describing manual tasks, disliked by many tradesmen, and inaccessible to those speaking other languages. Videos are more instructional, but take time and skill to develop, require staged lighting, require time and equipment to view, and cannot be easily presented at the factory workplace. Photographic essays are illustrative, but photos present too much information, make it difficult to discern what is relevant and what is not, and can lack the contrast to be clearly and quickly 'read' on the factory floor. Line drawings work well, but manual illustration can take days to prepare a single page of instructions. Illustrators are in any event expensive and hard to come by.

The solution is partly craft partly technological, and the results are quick and effective.

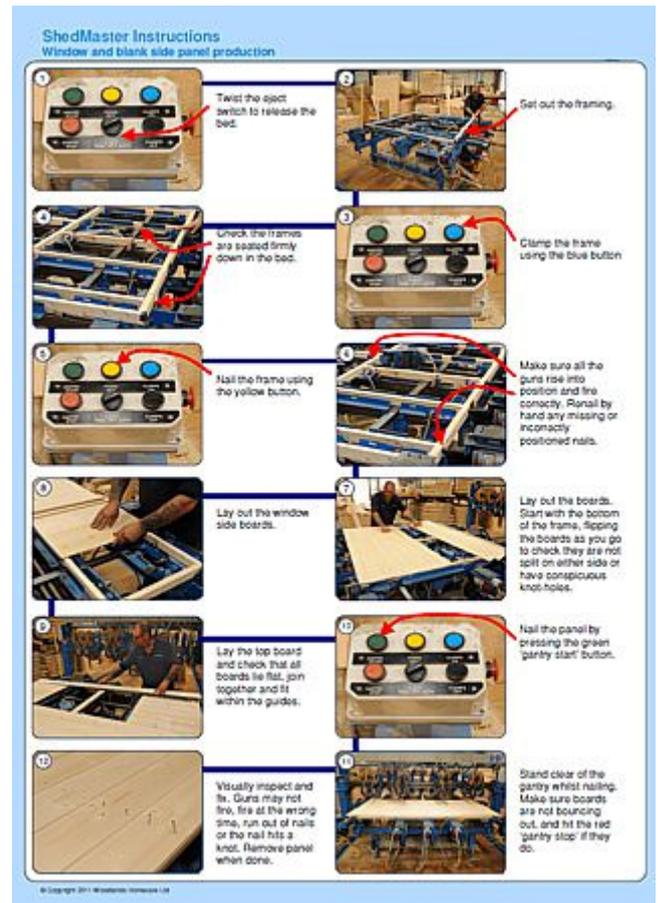
1. Observe the process and take a series of photographs to illustrate the important steps. Lighting and distortion are not important since the photos will be heavily edited later. An average DSLR with a wide angle lens was used in this case.



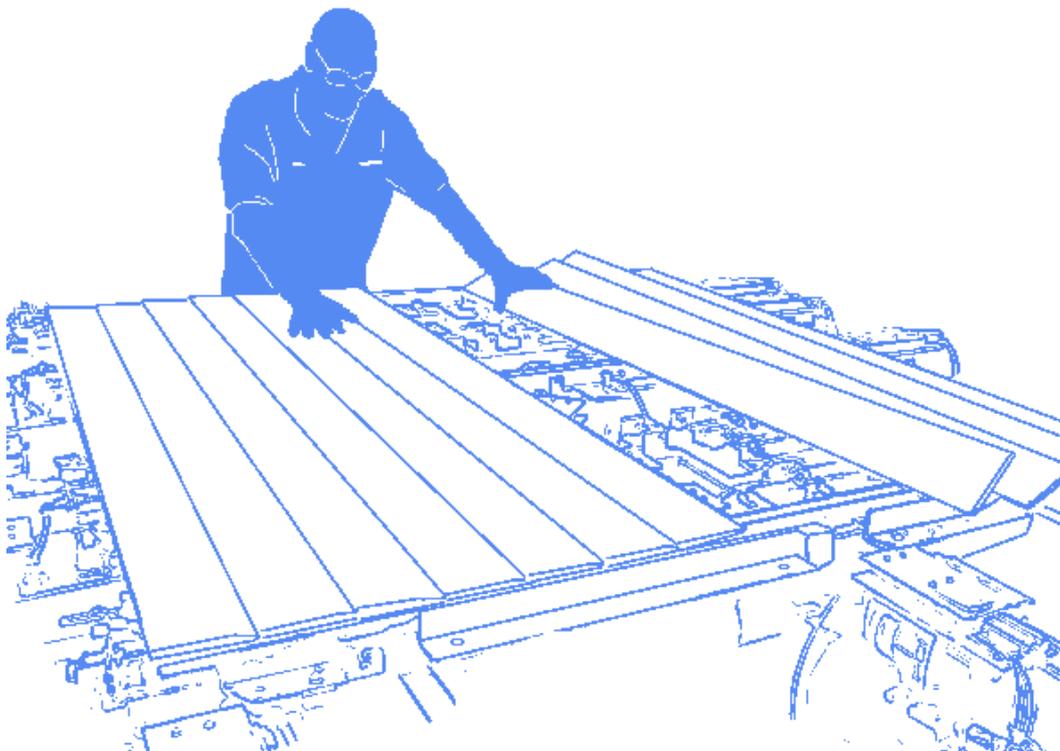
2. Using a basic graphics editor, crop the images to show context and the relevant actions. Here the step involved laying out boards on the machine, and it was important to focus on the operator's hand positions and the way the timber was fed:



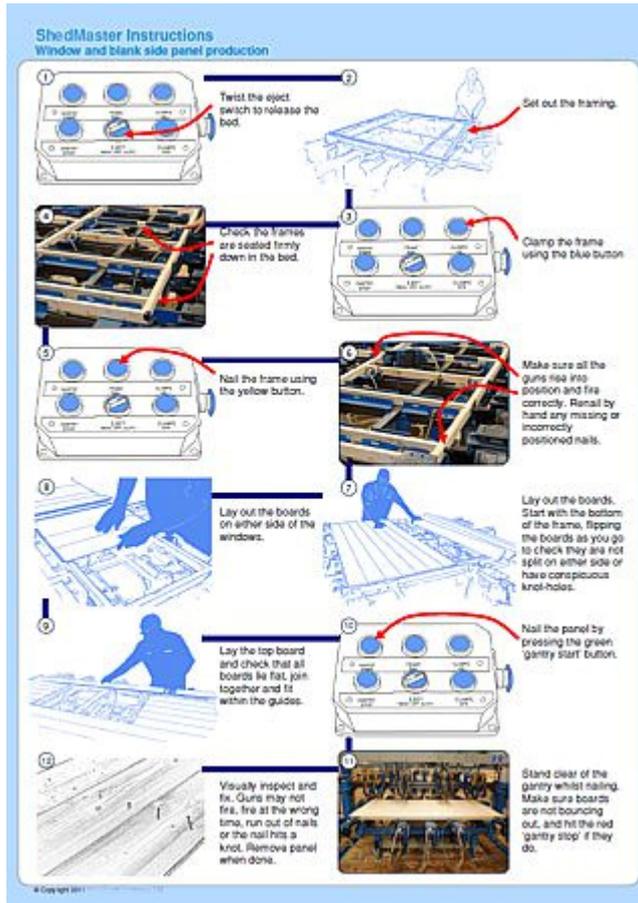
3. Prepare a draft of the instructions with photos and words. A conventional wordprocessor will do. The client's managers and machine operators then provide input and finalise the selection of content and photographs.



4. Once the images and content are finalised it is time to convert photos to line drawings. Using a graphics package to edit the image, first create a copy layer, run an outline trace on that and convert to monochrome. Add a third blank layer, lower its transparency, use a pen and line tool to describe the key areas, apply a selective merge and erase to blend in detail, apply fill to highlight the subject, change transparencies of the various board layers, and finally convert the colour to the company preference.



- Replace each of the photos on the instruction sheet with the line drawings.



- Finally laminate each sheet in clear plastic for protection. It may be useful to include blank area on the back of the sheet for operators to make notes, and to include reference numbers so the sheet can be quickly replaced and the operator notes cross-referenced. Create a reference pack to use at the workstation, and hang it where it is accessible.

This technique was also presented to an online forum and received the following comments:

“Wow, nice work. I worked with people at a manufacturing line, they do need the best possible instructions, and still they will do unpredictable stuff.” *Armando, Guadalajara*

“I very much enjoy seeing how graphics like this are created. Thanks for posting.” *Fred, USA*

“Beautiful result. This part ‘used a pen and line tool to draw the key areas’ seems like it could be a huge amount of work. And would also make for a great how-to.” *Lew, Maryland, USA*

“Well done! It takes a lot of work to do these but worth it!” *Erik, Copenhagen*

“Very well illustrated – not just the cards, but also the whole process. One point of consideration – the card used is using full color anyway – I would consider coloring the buttons – or at least the button you want to point out – color coding is very powerful and I wouldn’t bypass it.” *Bart, New Jersey*

“Nicely done! This gives me a good idea how things are done” *Eb, British Columbia*

“This is one of the most interesting posts I have seen here in a while as it goes beyond the image and through the entire communication process.” *Ron, Houston*

“Absolutely fascinating! Thanks for taking the time to share the steps with us.” *Virginia, USA*