

Standardization of Graphics for Service Information and Translation Expense Reduction

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ABSTRACT

The cost of human natural language translation of Service Information, Assembly Instructions, Training Materials, Operator Manuals and other similar documents is a major expense for manufacturers. One translation avoidance method involves replacing most of a document's text with still and/or animated graphics. While the graphics with minimum text concept has savings potential, clarity of communication must be maintained for widespread application of this technique. The necessary clarity should be achieved if standards are established for the symbols and graphical conventions used.

This paper provides an example of a repair procedure documented using the graphics with minimum text paradigm, describes many of the anticipated standards and provides an update on the progress towards achieving a standard development project.

INTRODUCTION

One of the effects of the globalization of the world's economy is increased demand for human language translation services. Many products are no longer designed and built for a single, local market. Instead they are designed and documented for manufacture in multiple factories located in several countries and are delivered with operator manuals and supporting documentation in still more countries. Even in the language "sheltered" United States of America, it is common to encounter consumer products with operating instructions in English, French, Spanish, German and more. Today, many countries require products sold within their borders be delivered with operator manuals

written in the local language. The time of building a product in one location and selling it in multiple countries with an English language manual is gone.

As a result, major Original Equipment Manufacturers (OEMs) each spend tens of millions of dollars every year on human natural language translation services. Furthermore, the same OEMs each likely spend additional millions of dollars to limit and manage their spending on translation services.

Some of the translation management tools used include various implementations and combinations of the following:

- Limited vocabulary
- Controlled and limited, language subset, including syntax and grammar
- Manual translation edit
- Translation memory
- Spelling and style-checker program

These tools attempt to achieve one or more of the following:

- Reducing complexity and variety of text translated
- Increasing reuse of previously translated text
- Avoiding retranslation of previously translated text

This paper describes another technique to reduce translation expense. It proposes reducing the amount of text authored within documents through extensive use of still and/or animated graphics.

WHAT A PICTURE IS WORTH

In the December 8th 1921 edition of the “Printers’ Ink” trade journal an advertising firm promoted advertizing on street cars. For that article a marketer named Fred R. Barnard wrote what quickly evolved to become a well known, “ancient Chinese”, saying. Indeed, by the March 10th, 1927 issue Mr. Barnard attributed: “One picture is worth ten thousand words”, to a “Chinese proverb”.¹ Whether ancient Chinese or modern wisdom, most people acknowledge the general truth of Mr. Barnard’s message; viewing a picture communicates more quickly than reading many words.

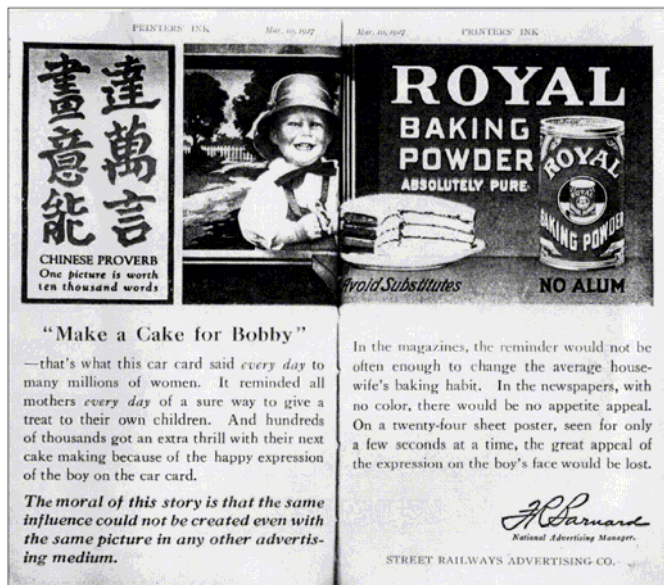


Figure 1 – “Ancient Chinese Proverb”

Unfortunately, in many cases individual interpretation of a picture results in significant variation in identifying the information contained. For example, the meaning of illustration in Figure 2 is obscure. The pattern shown might represent a crystal, specifically a snow-flake, but it might represent something else. Could it possibly be the void pattern of a solid rocket motor? Is it a building’s floor plan? If the figure is a drawing of a snow-flake, what is the intended message?



Figure 2 – A Picture of?

The meaning of the assumed snow-flake becomes clearer when the picture is combined with standard graphic elements, as shown in Figure 3.



Figure 3 – Picture With Standard Elements

The meaning of the combination of a standard picture presented with additional standard elements is taught through driver education classes. Indeed, the triangular shaped white area with a red border has its own standard meaning: “This is a warning!” When the example figure is presented within this standard context, the information the picture is intended to communicate becomes less subject to individual interpretation. The picture’s meaning consistently becomes: “Warning, risk of ice!”²



Figure 4 – Picture with Conventions and in Context

BEYOND STILL DRAWINGS – If a picture is worth a thousand words, how many words are animated pictures worth? Clearly, an animation communicates with clarity and completeness far beyond the abilities of one still picture.

Continuing, how many words are animated 3-D models worth? With the “reader’s” ability to observe a model

from different vantage-points, make sections and control components visibility or translucent, animated 3-D models have very high information content.

Indeed, the information content of light-weight 3-D models remains high enough that one should pause to evaluate the trade-offs between clear communication with an audience and the need for Intellectual Property Protection (IPP). IPP considerations when publishing 3-D models are the subject of another SAE International paper.³

CONCEPT'S BENEFITS – The main goal of this documentation paradigm is to reduce the total amount of money spent on technical documentation. Based on the results gathered to date, from John Deere dealerships, it appears implementing the graphics based documentation paradigm should achieve this goal.⁴ Furthermore, additional benefits have been identified from the animated, graphics documentation paradigm.

First time build yield improvements have been observed in the range of ten to thirty percent when work instructions are documented using 3-D animated graphics instead of traditional text with still pictures.⁵

Similar improvements may be expected when this documentation paradigm is applied to repairs of customer's machines at dealerships. Some remove and replace procedures are rarely performed. This results in long periods of time between repetitions. Due to the human tendency to forget seldom used information over long periods of time⁶, each instance of their performance becomes similar to a first time build in manufacturing. Furthermore, new technicians, or technicians cross-trained on multiple product lines, occasionally need to work on a machine that is unfamiliar to them. Thus, even if a repair procedure is a reasonably common occurrence for a machine, it may be a rare task for the service technician who must perform it.

Clearly an improvement in accurately executing "rare" procedures will result in reduced warranty expense for the company and increased customer satisfaction.

Animated, graphics based documentation supports distance learning and Just-In-Time training. It may be possible for training and technical publications departments to directly leverage animations developed for this documentation paradigm. This additional leverage facilitates more frequent and cost effective training while reducing the number of expensive hardware examples shipped to class locations.

Surveys of dealership owners, service managers and service technicians identified additional, possible benefits from this documentation paradigm:

- Increased capabilities for "reading challenged" employees⁴
- Improved comprehension⁴

While it seems intuitive that these benefits exist, it should be noted that these speculations have not been verified experimentally.

Finally, software applications for authoring and viewing animated 3-D models frequently support many of the features needed to identify the part numbers involved in an assembly. This access to the part numbers suggests the possibility of directly linking the parts catalog with repair procedures. Once serial number break and part number replacement issues are implemented, such linkage should speed customer repairs and improve labor productivity at dealerships.

ANIMATED GRAPHICS BASED EXAMPLE

Starting in 2006, John Deere started experimenting with using animated 3-D models to document remove and replace procedures. The purpose was to determine the feasibility of using 3-D visualization technology to reduce translation expenses. These experiments were made possible by the widespread presence of John Deere's interactive electronic technical manual, the Service ADVISOR™ system. The following figures are still images captured from one of the project's developed stories.

The procedure begins with the display of its title.

REMOVE THE PANHARD LINK (4 - CYLINDER TRACTOR)

Figure 5 – Procedure Title

Because this experiment is a small budget pilot project, the service technicians "reading" the procedure have not received training on how to use this animated documentation. Therefore, the next information presented in the story is the dictionary of the icons or symbols used to represent important actions in the story.

ACTION VERB ICONS



Figure 6 – Symbols Dictionary