Structure Development of a Software Manual System at SKF

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Abstract

The purpose of this thesis is to develop an overall strategy and structure for the software tool manual of the Orpheus platform. The Orpheus platform contains several powerful calculation software tools that are created, developed and used within Svenska Kullagerfabriken AB (SKF).

Both qualitative and quantitative research methodology was utilized in this thesis. The qualitative research data consisted of five in-depth interviews with employees whose main tasks were to write the manual and give support to the users of the software. The quantitative research data was gathered with the aid of an electronic survey. Furthermore, a cognitive walkthrough and literature studies, were performed.

The main problem with the web-based user manual was difficulties in finding information, which partly depended on the weak-designed layout and the structure of the user manual.

The author recommends, inter alia, tree-structured menus, logo on all pages, back button, page up button, linkable pictures and breadcrumbs that show where the user is in the structure.
Preface

The present report is a Master of Science in Ergonomic Design and Production, at Luleå University of Technology, Sweden.

This project, confined to analyses of the software tool manual with an ergonomic approach, was given as an assignment from SKF AB to Mrs. Ferdaus Najafi. The work started in the middle of January 2010 and ended in the middle of June 2010, at SKF AB, Gothenburg. I would like to express my sincere gratitude to all the people at EKS and M&S who were involved in this study, especially:

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1 Introduction

As software programs are getting smarter and having the capabilities to solve complicated calculations, the desire for more understandable and user-friendlier manuals is growing.

The Orpheus platform is a software system that contains powerful software tools that are used within Svenska Kullagerfabriken AB (SKF) for customer service, calculations and development purposes. The Orpheus platform is growing very fast and is getting more complicated every day.

Employees who use these software tools around the world are facing problems in finding the information in an easy manner in the existing web-based manual. For this reason a desire for a well designed and user friendly manual emerged.

1.1 Aim and Purpose

The purpose of this thesis is to develop an overall strategy and structure for the software tool manual used in the Orpheus platform. The strategy and structure should consider maintainability and be able to handle the internal and the external manual, as well as the internal layers (modules, packages, modes, theory, functionality, how-to’s and on-line training) within the tools. In a last step the strategy and structure ought to be demonstrated in a pilot manual.
Presentation of the Company

The following chapter contains information about the company, its history and the departments that had direct relationship and cooperation with this study.

2.1 Svenska Kullagerfabriken AB (SKF AB)

SKF AB is a global supplier of products, solutions and services within five platforms: bearings and units, seals, mechatronics, services and lubrication systems.

The SKF business is organized into three divisions: Industrial, Automotive and Service. Each division serves a global market, focusing on its specific customer segments. There are eight staff units: Group Legal; Group Communication; Group Finance & IT; Group Demand Chain; Global Relations; Group Human Resources & Sustainability; Group Technology Development & Quality and Group Business Development & Government Relations. Tom Johnstone is presently, October 2010, the president and Chief Executive Officer (CEO) of SKF AB (Figure 1).

Figure 1: The SKF Group’s units and divisions’ chart (http://www.skf.com).
SKF has over 41,000 employees around the world. SKF operates in around 40 customer segments, whereof examples include cars and light trucks, wind energy, railway, machine tool, medical, food and beverage and paper industries (http://www.skf.com).

2.1.1 SKF History
SKF was founded in 1907 by Sven Wingquist (1876-1953). He was a Swedish engineer, inventor and industrialist, and one of the founders of Svenska Kullagerfabriken (SKF). He was one of the world’s leading ball and roller bearing makers. He invented the multi-row, self-aligning radial ball bearing in 1907. In 1920 the company was well established in Europe, North and Latin America, Asia and Africa. Today, SKF is represented in more than 140 countries (Chalmers University of Technology, 2010).

2.2 Engineering Knowledge Services (EKS)
SKF Engineering Knowledge Services (EKS) belongs to Group Development Services within SKF, and is responsible for development, maintenance, support and training of the software tools used by SKF application- and development engineers (Figure 2). EKS cooperates with the department of Modelling and Simulation (M&S) which belongs to the Engineering & Research Center (ERC), which in turn is partly located in the Netherlands. ERC develop and integrate knowledge in order to model and simulate systems in the software tools (http://www.skf.com).
2.2.1 EKS History

EKS was founded under the name Engineering Software Support (ESS) on January 1st 2004. On March 10th 2008 ESS changed name to EKS because of a broader and updated vision and mission (http://www.skf.com).
3 Methodology and Implementation

This chapter includes all the methods that this study is based on. Sections 3.1 - 3.4 are focused on need-finding and the final two sections describe the methods that processed the gathered data for solutions.

3.1 Internet & Books

Literature studies are often used to gather background information for a study. Relevant literature can partly be found on the internet in form of published articles, books, guidelines and standards within the field concerned. The purpose of a literature study can be to produce a description of the current state of knowledge or to collect domain knowledge about a field (Osvalder, 2009).

This work began with a research on the internet and in books to gain information on design and evaluation of web sites and manuals. In particular, methods for identification of issues and their remediation were found. The recommendations thus found made it possible to identify some issues in the system at an early stage of the project.

3.2 Interview

Interviewing is the most fundamental method of gathering information regarding what people are thinking and imagining. There are three types of interviews, namely, structured, unstructured and semi-structured interviews (Osvalder, 2009).

Structured interviews
In a structured interview, the interviewee answers questions either freely or by selecting an answer from a predetermined scale. The results of structured interviews provide quantitative data which can easily be analyzed. This kind of interviews are common as telephone interviews or as short interviews in public places (Osvalder, 2009).

Unstructured interviews
In an unstructured interview, the interviewer asks open questions to the interviewee who can freely express his/her opinions. This kind of interview is also known as
open interview. It is appropriate when the interviewer already has a vague idea of which information is important but not much domain knowledge of the subject. The advantage of unstructured interviews is the opportunity to be able to follow-up interesting questions or enter in certain questions in more depth to understand how the interviewee thinks. The disadvantage is that the result can be difficult to compile and compare. An unstructured interview provides qualitative data and is a good method to use for explorative studies (Osvalder, 2009).

Semi-structured interviews
The semi-structured interview lies somewhere between a structured interview and a non-structured one. The semi-structured interview contains both predetermined and open questions. This provides opportunities for a more systematic analysis of the results as well as giving the interviewee the opportunity to partially steer the discussion. A semi-structured interview is less formal than a structured one and can give both qualitative and quantitative answers (Osvalder, 2009).

The EKS employees were interviewed to get a better understanding of the software, the manual and the development mission. Since the EKS Employees are few, it was possible to interview them all separately to understand the problem from different viewpoints and find each and everyone’s needs. Therefore a semi-structured interview technique was used. The first background questions were the same for all employees and the rest of the questions were adjusted depending on the individual’s tasks and skills.

3.3 Cognitive Walkthrough

A cognitive walkthrough method is a usability inspection method used to identify usability issues in a piece of software or web site, focusing on how easy it is for new users to accomplish tasks with the system (Nielsen, 1994).

A cognitive walkthrough method was used in order to identify the issues encountered by a beginner when he/she uses the manual system.

The focus was centred mainly on the first page of the manual where the user has to do some important choices to get to the right information. Therefore, the position of the pictures, the menus, the logo and other options has been analyzed. It was also important to observe how the information was presented on the screen and if the
link text was giving enough information about its functionality to the user. Furthermore, other issues like the background colour, the fonts and the headings have also been observed. The observations were analyzed and provided a base for planning a survey that was administered to the end-users.

3.4 Survey

A survey is an indirect method which means that there is no personal contact between the responsible of the study and the respondents. It is similar to the structured interview with the difference that the interviewer is not attending. This method aids to collect data from a large number of people during short time and people that are difficult to reach. The result is mainly quantitative but can also include qualitative results from open questions (Osvalder, 2009).

A survey that investigated the end-users’ opinions on and issues with the manual was constructed and sent to all end-users with at least a basic license for using the system. In this way the survey would reach people who are using the manual or have used it before.

The survey was sent by electronic mail to intern employees around the world. Two weeks were the amount of time that was given to the employees to respond to the survey and a reminder was sent after the first week.

The survey was based on information that was collected during the earlier stages of the project. The survey was divided into several sequences of questions. Each sequence was designed to process a main link or function in the manual (Appendix B). The division in sequences made it possible to identify exactly in what part of the manual the end-users had complications and what kind of difficulties they were facing when using the manual.

3.5 Sketches

A sketch is a rapidly executed freehand drawing that is not intended as a finished work. In general, a sketch is a quick way to record an idea for later use. Different ideas can be tried out and a composition can be established before undertaking a
more finished work, especially when the finished work is expensive and time consuming (http://www.etymonline.com).

In this study the sketching activities began at an early stage. The more information that was collected, the more ideas were produced and presented in sketches. The sketches are simple drawings that show different designs of how the manual could look like and various structures of the navigation system.

3.6 Concepts

The sketches matured gradually and were in the end transformed into concepts. The concepts were presented to the experts at EKS and M&S at a number of meetings and the most appropriate structure and design of the manual system was decided upon.
4 Theory

Since the current manual is web-based, it was necessary to use state-of-the-art knowledge on how to create a well-designed web site and on how to write manuals.

4.1 Web Design

U.S. Department of Health and Human Services provides a comprehensive set of guidelines for design of web sites (U.S. Department of Health and Human Services (HHS), 2006). The guidelines are compiled from research findings on usability of web sites and represent the current state-of-art. In chapter 4.1 the guidelines that were relevant for this project are represented in abbreviated form.

4.1.1 Design Process and Evaluation

This section presents several usability-related issues, method and procedures that require careful consideration when designing and developing web sites.

Setting and Stating Goals

The primary goals of the web site should be identified and clearly expressed before beginning the design process (Badre, 2002).

Providing Useful Content

Content is the most critical element of a web site. It should be interesting, relevant, and appropriate to the audience. The content is more important than navigation, visual design, functionality, and interactivity (Badre, 2002).

Establishing User Requirements

It is important to understand the user requirements by using all available resources. The more information that can be exchanged between the developers and the users, the higher the probability of having a successful web site. These could include customer support, customer surveys and interviews, user groups, etc. (HHS, 2006).
Understanding and Meeting User’s Expectations

The web site format should meet the users’ expectations especially when it is related to navigation, content, and organization. One study found that users define ‘usability’ as their perception of how consistent, efficient, productive, organized, easy to use, intuitive, and straightforward it is to accomplish tasks within a system. Users can have expectations based on their prior knowledge and past experience. Users are used to act on their own expectations even when there are indications on the screen to counter those expectations. The use of familiar formatting and navigation schemes makes it easier for users to learn and remember the layout of a site (HHS, 2006).

4.1.2 Optimizing the User Experience

This section discusses how to design web sites that facilitate and encourage efficient and effective human-computer interaction.

Avoiding Displaying unwanted Windows or Graphics ‘Pop Up’

Unwanted windows and graphics ‘pop up’ distract the users especially when they are focusing on completing their original activity (HHS, 2006).

Increasing the Web Site’s Credibility

The credibility of the web sites should be optimized especially the information-oriented ones. The most important actions that organizations can do to help ensure high web site credibility are:

- Providing a useful set of frequently asked questions (FAQ) and answers;
- Ensuring that the web site is arranged in a logical way;
- Providing articles containing citations and references;
- Showing the author’s qualifications;
- Ensuring that the site looks professionally designed;
- Providing an archive of past content (where appropriate);
- Ensuring that the site is as up-to-date as possible;
- Providing links to outside sources and materials; and
- Ensuring that the site is frequently linked to by other credible sites (HHS, 2006).
Standardizing the Task Sequences
Users should be allowed to perform tasks in the same sequence and manner across similar conditions. Users learn certain sequences of behaviors and perform best when they can be consistently repeated. For example, users become familiar to look in either the left or right panels for additional information or with the steps in a search process (HHS, 2006).

Reducing the User's Workload
Letting the computer perform as many tasks as possible, makes it easier for the users to concentrate on performing tasks that actually require human processing and input (HHS, 2006).

Designing for Working Memory Limitations
Users shouldn't be asked to remember information from place to place on a web site. Users can remember relatively few items of information for a relatively short period of time. This ‘working memory’ capacity tends to decrease even more as people become older. When users must remember information on one web page for use on another page or another location on the same page, they can only remember about three or four items for a few seconds (HHS, 2006).

Minimizing the Page Download Time
The time required to download a web site’s page should be minimized. The best way to facilitate fast page loading is to minimize the number of bytes per page (HHS, 2006).

Warning of 'Time Outs'
Some pages are designed to 'time out' automatically (usually because of security reasons). Users should know if a page is programmed to 'time out,' and they should get warned before time expires so they can request additional time (HHS, 2006).

Displaying Information in a Directly Usable Format
Data and information should be displayed in a format that does not require conversion by the user. Information should be presented in the most useful and usable format possible. For multinational web audience, information should be provided in multiple formats (e.g., centigrade and Fahrenheit for temperatures) or
the user should be allowed to select their preferred formats (e.g., the 24-hour clock for European audiences and the 12-hour clock for American audiences). Users should not be asked to convert, reverse, compute, or translate displayed data into other units, or to refer to documentation to determine the meaning of displayed data (HHS, 2006).

**Formatting Information for Reading and Printing**

Information should be prepared with the expectation that it will either be read online or printed. Usually the size of the document determines the decision of printing or reading it online. Users print long documents (over five pages) and read the short documents online.

In addition, users prefer to print information that is related to research, presentations, or supporting a point. They like reading it online if for entertainment. Users tend to print:

(a) if the online document required too much scrolling,
(b) if they needed to refer to the document at a later time, or
(c) the complexity of the document required them to highlight and write comments.

When the document is too long, the users may only be interested in a particular section. A ‘Print Friendly’ link might be a good idea to have in this situation. When clicking, a new browser window will open that allows the user to choose the sections of the document he/she wish to print (HHS, 2006).

**Providing Feedback When Users Must Wait**

If processing will take less than ten seconds an hourglass should be used to indicate the status. If processing will take up to 60 seconds or longer it is better to use a process indicator that shows progress towards completion and if computer processing will take over one minute, an auditory signal should be provided when the processing is complete. Users frequently become involved in other activities when they know they must wait for long periods of time for the computer to process information. Under these circumstances, completion of processing should be indicated by a non-disruptive sound (beep) (HHS, 2006).
Informing Users of Long Download Times

The users should be informed of the time required to download an image or document at a given connection speed. This will give the users enough information to choose whether or not they are willing to wait for the file to download (HHS, 2006).

Providing Assistance to First-Time-Users

Some users might need additional help with the web site. A special link with the title For Beginners or First Time User would be a good way to allow the new users to access more information about the content of the site and the best way to navigate the site (HHS, 2006).

4.1.3 Accessibility

Web sites should be designed to ensure that everyone, including users who have difficulty seeing, hearing and making precise movements can use them (HHS, 2006). The following section presents some assistive technologies on the web sites.

Avoiding to Use Colour Alone to Convey Information

All information conveyed with colour should also be available without colour. Most users with colour deficiencies have difficulty seeing colours in the green portion of the spectrum.

To accommodate colour-deficient users the designer should consider some important points:

- Selection of colour combinations that can be discriminated by users with colour deficiencies;
- Using tools that show how the web pages would look like when seen by colour deficient users;
- Ensuring that the lightness contrast between foreground and background colours is high;
- Increasing the lightness contrast between colours on either end of the spectrum (e.g., blues and reds); and
- Avoiding the combination of light colours from either end of the spectrum with dark colours from the middle of the spectrum (HHS, 2006).
Providing Descriptive Text for Non-Text Elements

Descriptive text should be used for all non-text elements, including images, graphical representations of text (including symbols), animations, frames, graphical buttons, sounds, and video (HHS, 2006).

4.1.4 Hardware and Software

As designers consider their users’ needs for specific information, they must also consider any possible restrictions on their users’ hardware, software, and speed of connection to the Internet (HHS, 2006).

Designing for Commonly Used Screen Resolutions

The web site should be designed for monitors with the screen resolution set at 1024x768 pixels. In this way the designer will accommodate this most common resolution, as well as those at any higher resolution. It is also important to ensure that all testing of web sites is done using the most common screen resolutions (HHS, 2006).

4.1.5 The homepage

The homepage is different from all other web site pages. A well-constructed homepage will project a good first impression to all who visit the site (HHS, 2006).

Enabling Access to the Homepage

Users should be able to access the homepage from any other page on the web site. Many users return to the homepage to begin a new task or to start a task over again. It is important to create an easy and obvious way for users to quickly return to the homepage of the web site from any point in the site.

Many sites place the organization’s logo on the top of every page and link it to the homepage. These logos and their placement remain constant throughout the web site.
While many users expect that a logo will be clickable, many other users will not realize that it is a link to the homepage. Therefore, it is important to include a link labelled ‘Home’ near the top of the page to help those users (HHS, 2006).

**Showing All Main Options on the Homepage**

Presenting all main options on the homepage makes it easier for the user to see through all the options at the same time. Users should not be required to click down to the second or third level to discover all options on a web site. It is also important to be selective about what is placed on the homepage. The options and links that are presented should be the most important ones on the site (HHS, 2006).

**Creating a Positive First Impression of the Site**

The homepage should present the quality of the web site. It is probably the most important page on a web site. One study found that when asked to find high quality web sites, about half of the time participants looked only at the homepage. There will not be a second chance to make a good first impression on a user (HHS, 2006).

**Limiting Prose Text on the Homepage**

The amount of prose text should be limited on the homepage. Users usually scan the homepage for link titles and major headings first. Requiring users to read large amounts of prose text can slow them considerably, or they may avoid reading it altogether.

Clean, prose-free design allows users to quickly recognize the primary headings and sub-headings without the distraction of paragraphs of text (Badre, 2002).

**Ensuring that the Homepage Looks like a Homepage**

The homepage should have the necessary characteristics to be easily understood as a homepage. Users have come to expect that certain actions are possible from the homepage. These actions include, among others, finding important links, accessing a site map or index, and performing a search. On the second and third level pages a less visually imposing masthead\(^1\) and specific content should be used (HHS, 2006).

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\(^1\) On the Internet, a masthead is a graphic image or text title at the top of a web page that identifies the web site. (Search CRM, 2003)
Limiting Homepage Length
The homepage should be limited to one screenful\(^2\) of information, if at all possible. Any element on the homepage that must immediately attract the attention of users should be placed 'above the fold'\(^3\). Information that cannot be seen in the first screenful may be missed altogether—this can negatively impact the effectiveness of the website. If the visible portion of the page is not attracting the users’ interest, they may not bother scrolling to see the rest of the page (HHS, 2006).

Announcing Changes to a Web Site
The major changes to a website should be announced on the homepage to not surprise the users. Users may not know what to do when suddenly faced with a new look or navigation structure. Therefore, it is important to communicate any planned changes to users ahead of time. After completion of changes, the users should be informed what exactly has been changed and when the changes were made. It’s also important to promise users that all previously available information will continue to be on the site (HHS, 2006).

4.1.6 Page Layout
All web pages should be structured for ease of comprehension. This includes putting items on the page in an order that reflects their relative importance. (HHS, 2006).

Avoiding Cluttered Displays
It is important to create pages that are not considered cluttered by users. Clutter is when the amount of items on a page lead to a degradation of performance when trying to find certain information. On an uncluttered display, all important search targets are highly outstanding and clearly available (HHS, 2006).

Placing Important Items Consistently
Important and clickable items should be placed in the same locations, and closer to the top of the page, where their location can be better estimated. When screen items remain constant, users learn their location on a page, and use this knowledge

\(^2\) The amount of information visible at one time on a display/screen
\(^3\) The content at the top of a webpage is located “above the fold”.
to improve task performance. Experienced users will begin moving their mouse pointer to the area of the target before the eye detects the item. Users can anticipate the location of items near the top much better than those further down the page (Badre, 2002).

**Placing Important Items at Top Centre**
Most important items should be placed at the top centre of the web page to facilitate users’ information search. Users generally look at the top centre of a page first, then look left, then right, and finally begin systematically moving down the total web page. All critical content and navigation options should be toward the top of the page. Particularly on navigation pages, most major choices should be visible with no, or a minimum of, scrolling.

Eye-tracking studies indicate that top centre of the web page is the area where most new users first look when a web site page loads (Figure 3) (HHS, 2006).

![Figure 3](image)

**F-Shaped Pattern for Reading Web Content**
Eye-tracking visualizations show that users often read web pages in an F-shaped pattern: two horizontal stripes followed by a vertical stripe (Figure 4).

Users first read in a **horizontal movement**, usually across the upper part of the content area. This initial element forms the F’s top bar. Next, users move down the page a bit and then read across in a **second horizontal movement** that typically covers a shorter area than the previous movement. This additional element forms the F’s lower bar.
Finally, users scan the content's left side in a **vertical movement** (Jakob Nielsen, 2006).

![Figure 4: Top centre of the Heatmaps from user eyetracking studies of three web sites. The areas where users looked the most are coloured red; the yellow areas indicate fewer views and the least-viewed areas are shown in blue. Gray areas didn't attract the users’ eyes (Jakob Nielsen, 2006).](image)

**Establishing Level of Importance**

Establishing a high-to-low level of importance of information on the web site helps users to find the most important information easier. Important information should appear higher on the page so users can locate it quickly. The least used information should appear towards the bottom of the page. Information should be presented in the order that is most useful to users. People prefer hierarchies, and tend to focus their attention on one level of the hierarchy at a time. This enables them to follow a more systematic strategy when scanning a page. The order of the information can be determined by surveys, log analyses and interviews (HHS, 2006).

**Optimizing Display Density**

To facilitate finding target information on a page, it is important to create pages that are not too crowded with items of information. One essential method is the use of white space. The areas with white space help users to scan the webpage in an easy and fast way and also give their eyes a rest (HHS, 2006).
Aligning Items on a Page

Page elements should be visually aligned either vertically or horizontally. Users prefer consistent alignments for items such as text blocks, rows, columns, checkboxes, radio buttons, data entry fields, etc. Using inconsistent alignments make it extremely difficult for the user to scan the page which consequently leads to slow users’ attempts to find information (Figure 5). Consistent alignments allow the information to fall easily to the eye. It should be used across all web pages (HHS, 2006).

Figure 5: Inconstant list columns make it extremely difficult for the user to scan (HHS, 2006).
Using Fluid Layouts

A fluid layout that automatically adjusts the page size to monitor resolution settings that are 1024x768 pixels or higher should be used. Flexible, or liquid, layouts allow users to adjust web pages to fit their screen space (Figure 6) (HHS, 2006).

![Flexible/Liquid layout](HHS, 2006)

Avoiding Scroll Stoppers

The location of headings and other page elements should not create the illusion that users have reached the top or bottom of a page when they have not.

When scrolling up the page, the design of the header (bold, shadowed, and bordered by bars) might suggest that the user has reached the top of the page, when a quick look at the scroll bar will indicate that much of the page exists above this section (Figure 7).
Other elements that may stop users' scrolling are horizontal lines, inappropriate placement of 'widgets'\(^4\) and ending of background colour (HHS, 2006).

### Setting Appropriate Page Lengths

It is important to make page-length decisions that support the main use of the web page. In general, shorter pages should be used for homepages, navigation pages, pages that need to be quickly browsed and/or be read online. Longer pages should be used to aid uninterrupted reading, especially on content pages, and even to make pages more suitable for printing (HHS, 2006).

### Using Limited Amount of White Space

The amount of white space\(^5\) should be limited on pages that are used for scanning and searching. Some white space should be used to separate paragraphs. Too much separation of items on web pages may require users to scroll unnecessarily (HHS, 2006).

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\(^4\) Widget (or control) is an element of a graphical user interface (GUI) that displays an information arrangement changeable by the user. Typical widgets include buttons, dialog boxes, pop-up windows, pull-down menus, icons and scroll bars. (Webopedia, 2010)

\(^5\) White space are areas without text, graphics, etc
Choosing Appropriate Line Lengths

If reading speed is most important, it is better to use longer line lengths (75-100 characters per line) (Figure 8). If acceptance of the web site is most important, shorter line lengths (fifty characters per line) should be used.

Users read faster when line lengths are long. When space for text display is limited, it is better to display a few longer lines of text rather than many shorter lines of text. Continuous text in columns should contain at least fifty characters per line (HHS, 2006).

4.1.7 Navigation

Navigation refers to the method used to find information within a web site. A navigation page is used primarily to help users locate and link to destination pages. A web site’s navigation scheme and features should allow users to find and access information effectively and efficiently (HHS, 2006).

Providing Navigational Options

Users should not be directed into pages that have no navigational options. Many web pages contain links that open new browser windows. When these browser windows open, the Back button is disabled (in fact, the new browser window knows
nothing of the user’s past navigation, and thus is disabled). If the new window opens full-screen, users may not realize that they have been redirected to another window, and may become frustrated because they cannot press Back to return to the previous page. If such links are incorporated into a web site, the newly-opened window should contain a clear action control that will close the window and return the user to the original browser window.

In addition, designers should not create web pages that disable the browser’s Back button. Disabling the Back button can result in confusion and frustration for users, and drastically slow down their navigation (HHS, 2006).

Differentiating and Grouping Navigation Elements

It is important to clearly differentiate navigation elements from one another, but group and place them in a consistent way to make it easy to find their place on each page. Creating a common, web site navigational scheme will help users to learn and understand the structure of the web site. It is also important to use the same navigation scheme on all pages by consistently locating tabs, headings, lists, search, site map, etc. Critical navigation elements should be located in places that will suggest clickability (e.g., lists of words in the left or right panels are generally assumed to be links).

In addition, navigational elements should be different enough from one another so that users will be able to understand the difference in their meaning and destination. Grouping reduces the amount of time that users need to locate and identify navigation elements. Finally, it should be easy for users to move from label to label (link to link) with a single eye movement. This best can be done by positioning relevant options close together and by using vertical lists (HHS, 2006).

Using a Clickable ‘List of Contents’ on Long Pages

For long pages with several different sections, it is useful to provide a clickable list of contents (also called ‘anchor links’) at the top of the page that take users to the corresponding content further down the page.

‘Anchor links’ can serve two purposes: they provide an outline of the page so users can quickly determine if it contains the desired information, and they allow users to quickly navigate to specific information (HHS, 2006).
Providing Feedback on Users' Location
Feedback on user’s location let users know where they are in the web site and also help them to proceed to the next activity. Feedback can be in form of providing path and hierarchy information like ‘breadcrumbs’, matching link text to the destination page’s heading and changing the colour of a link that has been clicked (suggesting that destination has been visited) (HHS, 2006).

Using Descriptive Tab Labels
The tab labels should be clearly descriptive of their function or destination. Users like tabs when they have labels that are descriptive enough to allow error-free selections. When tab labels cannot be made clear because of the lack of space, tabs shouldn’t be used (Badre, 2002).

Using ‘Glosses’ to Assist Navigation
It is very useful to provide ‘glosses’ to help users select correct links. ‘Glosses’ are short phrases of information that popup when a user places his or her mouse pointer close to a link. It provides a preview to information behind a link (Figure 9). Users prefer the preview information to be located close to the link, but not placed such that it disturbs the primary text. However, designers should not rely on the ‘gloss’ to compensate for poorly labelled links (HHS, 2006).

Figure 9: When placing the mouse pointer over the links in the menu left a ‘gloss’ appears on the right that provides information about the content contained under that particular link (HHS, 2006).
4.1.8 Scrolling
Designers must decide, early in the design process, whether to create long pages that require extensive scrolling or shorter pages that will require users to move frequently from page to page. This decision will be based on considerations of the primary users and the type of tasks being performed (HHS, 2006).

Eliminating Horizontal Scrolling
An appropriate page layout should be used to eliminate the need for users to scroll horizontally. Horizontal scrolling is a slow and frustrating way to view an entire screen (Figure 10). Common page layouts including fluid and left-justified may require some users to scroll horizontally if their monitor resolution or size is smaller than that used by designers (HHS, 2006).

Figure 10: This webpage require users to scroll horizontally.(HHS, 2006).
Facilitating Rapid Scrolling While Reading

To facilitate fast scrolling, major items should be highlighted. When the scroll box is dragged, the information may move too fast on the screen. Bold, large headings that are well-designed and clearly placed are effectively used to draw the user’s attention during fast scrolling (Figure 11) (HHS, 2006).

Figure 11: Bold, large text and an accompanying graphic are effectively used to draw the user’s attention during fast scrolling. (HHS, 2006).
4.1.9 Links
Linking means that users select and click on a hypertext link on a starting page (usually the homepage), which then causes a new page to load. Users continue toward their goal by finding and clicking on subsequent links.

Using Meaningful Link Labels
Meaningful and understandable link labels should be used to avoid confusions. Users should be able to look at each link and learn something about the link’s destination.

Clear labelling is especially important as users navigate down through the available links. The more decisions that users are required to make concerning links, the more opportunities they have to make a wrong decision (HHS, 2006).

Matching Link Names with Their Destination Pages
Making the link text consistent with the title or headings on the destination page helps to provide useful feedback to users that they have reached the target page (HHS, 2006).

Avoiding Misleading Signs to Click
Items that are not clickable should not have characteristics that suggest that they are clickable. To some users bullets and arrows may suggest clickability, even when they contain no other clickability signs (underlining, blue colouration, etc.). This slows users as they wonder whether the items are links (HHS, 2006).
Repeating Important Links

Important content should be accessed from more than one link. Users may try different ways to find information, depending on their own interpretations of a problem and the layout of a page. Establishing more than one way to access the same information can help some users to easier find what they need (Figure 12) (HHS, 2006).

Using Text for Links

In general, text links are more easily recognized as clickable. Text links usually download faster and are preferred by users. It is usually easier to convey a link’s destination in text, rather than with the use of an image (HHS, 2006).
Designating Used Links
Colour changes should be used to indicate to users when a link has been visited. Generally, it is best to use the default text link colours (blue as an unvisited location/link and purple as a visited location/link). Link colours help users understand which parts of a web site they have visited and also it improves the user’s speed of finding information. If a user selects one link, and there are other links to the same target, it is important to make sure all links to that target change colour (HHS, 2006).

Ensuring that Embedded Links are Descriptive
When using embedded links, the link text should accurately describe the link’s destination (Figure 13). Users tend to ignore the text that surrounds each embedded link; therefore, it is important to not create embedded links that use the surrounding text to add clues about the link’s destination. The user does not have to read the surrounding text to understand the destination of the embedded link (Figure 14) (HHS, 2006).

Figure 13: Well designed embedded links; the entire organization name is a link (HHS, 2006).
Using ‘Pointing-and-Clicking’

‘Pointing-and-clicking’, rather than mousing over, is preferred when selecting menu items from a pull-down menu structure. ‘point-and-click’ method elicits fewer errors, and is preferred by users (HHS, 2006).
Using Appropriate Text Link Lengths
Text links should be long enough to be understood, but short enough to minimize wrapping. A single word text link may not give enough information about the link’s destination. A link that is several words may be difficult to read quickly, particularly if it wraps to another line. Generally, it is best if text links do not extend more than one line (Figure 15) (HHS, 2006).

![Figure 15: Whenever possible, text links should only cover one line (HHS, 2006).](image)

Clarifying Clickable Regions of Images
If any part of an image is clickable, it is important to ensure that the entire image is clickable or that the clickable sections are obvious. Users should not be required to use the mouse pointer to discover clickable areas of images (HHS, 2006).

4.1.10 Text Appearance
This section introduces several issues related to text characteristics that can help ensure a web site communicates effectively with users.

Using Black Text on Plain, High-Contrast Backgrounds
When users are expected to rapidly read and understand prose text, it is important to use black text on a plain, high-contrast, non-patterned background. Black text on
a plain background elicits reliably faster reading performance than on a textured background. When compared to reading light text on a dark background, people read black text on a white background up to thirty-two percent faster. In general, the greater the contrast between the text and background, the easier the text is to read (HHS, 2006).

**Using Bold Text Sparingly**
Bold text should be used only when it is important to draw the user's attention to a specific piece of information. In general, bold text should be used sparingly (HHS, 2006).

**Using Attention-Attracting Features when Appropriate**
Attention-attracting features should be used with caution and only when they are highly relevant. Attention could be drawn to specific parts of a web page with the appropriate (but limited) use of:

- moving or animated objects,
- size differential between items,
- images,
- brightly-coloured items, and
- varying font characteristics

Not all features of a web site will attract a user’s attention equally. The following features are presented in order of the impact they have on users:

- Movement (e.g., animation) is the most effective attention-getting item. Users cannot stop themselves from initially looking at moving items on a page. However, if the movement is not relevant or useful, it may annoy the user. If movement continues after attracting attention, it may distract from the information on the web site.

- Larger objects, particularly images, will draw users’ attention before smaller ones. Users fixate on larger items first, and for longer periods of time. However, users will tend to skip certain kinds of images that they believe to be advertisements or decoration.
Users look at images for one or two seconds, and then look at the associated text caption. In many situations, reading a text caption to understand the meaning of an image is a last option. Parts of images or text that have brighter colours seem to gain focus first.

Having some text and graphic items in brighter colours, and others in darker colours, helps users determine the relative importance of elements. Important attention-attracting font characteristics can include all uppercase, bolding, italics, underlining, and increased font size (HHS, 2006).

**Using Familiar Fonts**

Familiar font should be used to achieve the best possible reading speed. Using unfamiliar fonts may slow reading speeds. Most user friendly ones are: twelve point Times New Roman, Georgia (serif fonts), Arial, and Verdana (sans serif fonts) (HHS, 2006).

**4.1.11 Lists**

Lists are commonly found on web sites. The following section discusses the importance of clear structured lists.

**Placing Important Items at Top of the List**

A list’s most important items should be placed at the top. Experienced users usually look first at the top item in a menu or list, and almost always look at one of the top three items before looking at those further down the list (HHS, 2006).

**Displaying Related Items in Lists**

It is practical to display a series of related items in a vertical list rather than as continuous text. A well-organized list format tends to facilitate rapid and accurate scanning. Users scan vertical lists more rapidly than horizontal lists (HHS, 2006).

**Formatting Lists to Ease Scanning**

Lists should be easy to scan and understand. The use of meaningful labels, effective background colours, borders, and white space allow users to identify a set of items as a discrete list (HHS, 2006).
Introducing Each List
Providing a descriptive heading at the top of each list allows users to readily understand how the items are related to each other and how they are categorized. This helps the user to rapidly determine whether the information he/she is seeking is in the list (HHS, 2006).

Using Static Menus
It is very practical to use static menus to obtain the fastest possible speed when accessing menu items. The most frequently used menus items should be placed in the first few positions of a menu (Figure 16) (HHS, 2006).

![Figure 16: Static menu (HHS, 2006).](image)

Using Appropriate List Style
Bullet lists should be used when presenting items of equal status or value and numbered lists should be used if a particular order to the items is necessary. Bullet lists work best when the items do not contain an order, or rank. Numbered lists are especially important when giving instructions (HHS, 2006).

Capitalizing First Letter of First Word in Lists
It is important to capitalize the first letter of only the first word of a list item, a list box item, check box labels, and radio button labels. Only the first letter of the first word should be capitalized unless the item contains abbreviation, acronym or other word that would normally be capitalized (HHS, 2006).
4.1.12 Data Entry Fields

Entry fields are used when completing forms and entering text into search boxes. The following section includes practical information about data entry fields.

Distinguishing Required and Optional Data Entry Fields

Required data entry fields should be clearly and consistently distinguished from optional data entry fields. Users should be able to easily determine which data entry fields are required and which are optional. Asterisks (*) and labelling data entry field names with 'required' are two popular and effective methods of distinguishing between optional and required data entry fields (Figure 17) (HHS, 2006).

![Figure 17: Asterisks (*) and labeling data entry field names with 'required' are two popular and effective methods of distinguishing between optional and required data entry fields (HHS, 2006).]

Labelling Data Entry Fields Clearly

Descriptive labels that clearly and concisely define the required entry should be used to help users understand what entries are desired. It is important to avoid new jargon when labelling data entry fields (HHS, 2006).
Minimizing User Data Entry

Users should not be required to enter the same information more than once. Requiring re-entry of data imposes an additional task on users, and increases the possibility of entry errors. When entries made by users on one page are required on another page, the computer should copy the original entries, rather than requiring re-entry of the same information (Figure 18). In general, users should be required to make as few entries as possible (HHS, 2006).

![Figure 18: Eliminating the need for users to re-input same data (HHS, 2006).]

4.1.13 Graphics, Images, and Multimedia

Graphics are used on most web pages. When used appropriately, graphics can facilitate learning.

Using Simple Background Images

Background images should be used sparingly especially if they are used behind text. Background images can make it difficult for users to read foreground text. A single, large, complex background image (including a picture) can considerably slow page download rates. If background images must be employed, small, simple
images with 'tiling' could be used. Another option is to keeping the image resolution as low as possible (HHS, 2006).

**Labelling Clickable Images**

All clickable images should be labelled and readily understood by typical users. Images and their associated text should be close together so that users can integrate and effectively use them together (Figure 19) (HHS, 2006).

![Figure 19: The addition of labels is necessary for users to understand the clickable image links (HHS, 2006).](image)

**Ensure that Images Do Not Slow Downloads**

Images on the web site should not slow page download times unnecessarily. User frustration increases as the length of time spent interacting with a system increases (HHS, 2006).

**Using Video, Animation, and Audio Meaningfully**

It is practical to use video, animation, and audio only when they are supportive of the web site’s content. Multimedia elements (such as video, animation, and audio) can easily capture the attention of users; therefore, it is important to have clear and useful reasons for using multimedia to avoid unnecessarily distracting users. Some multimedia elements may take a long time to download, so it is important that they be worth the wait.
Used productively, multimedia can add great value to a site’s content and help direct users’ attention to the most important and useful information (HHS, 2006).

**Including Logos**
Organization’s logo should be placed in a consistent place on every page. Users are frequently unaware when they click through to a different web site. Having a logo on each page provides a frame of reference throughout a web site so that users can easily confirm that they have not left the site. Ideally, the logo should be in the same location on each page: many designers place the logo in the top left corner (HHS, 2006).

**Graphics Should Not Look like Advertisements**
Important images should not look like advertisements or unnecessary decorations (Figure 20). Users may skip this design element, even though the graphic is larger than most other graphics on the page (Badre, 2002).

![Figure 20: This graphic, which contains three major, linked headers, looks like advertisement. Consequently, users may skip over this design element, thus missing the headers (HHS, 2006).](image-url)
Limiting Large Images Above the Fold

The entire first screenful should not be filled with one image if there is text information below the fold\(^6\) (Figure 21). Large graphics that cover most of the screen at the top of the page suggest to users that there is no additional information below the graphic (HHS, 2006).

![Figure 21](image.png)

Figure 21: As the scroll bar shows, there are several additional screenfuls of information below this large navigation graphic. Users may not look at the scroll bar, thus missing that information (HHS, 2006).

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\(^6\) The content the user sees once he/she scrolls to the middle or bottom of a webpage, called “below the fold”. 
Limiting the Use of Images

Images should be only used when they are critical to the success of the web site. It is important to ensure that a web site’s graphics add value and increase the clarity of the information on the site. Certain graphics can make some web sites much more interesting for users, and users may be willing to wait a few extra seconds for them to load. Users tend to be most frustrated if they wait several seconds for a graphic to download, and then find that the image does not add any value (Figure 22). Some decorative graphics are acceptable when they do not distract the user (Badre, 2002).

Figure 22: This image is unrelated to the accompanying content (HHS, 2006).
**Introducing Animation**

An introductory explanation for animation should be provided prior to it being viewed. In other words, each animation should be accompanied by text that explains to the user what they are about to see (Figure 23). This helps users to integrate the animation and associated content better.

Also, it is important to allow animations to be user-controlled. User should be able to pause, stop, replay, or ignore an animation or other multimedia elements (HHS, 2006).

![Figure 23: Each video clip is accompanied by text that explains to the user what they are about to view. In addition, this web site allows the user to control when to start the video clip (HHS, 2006).](image-url)
Using Thumbnail Images to Preview Larger Images

When viewing full-size images is not critical, it is practical to provide a thumbnail of the image first (Figure 24). By providing thumbnails of larger images, users can decide whether they want to wait for the full image to load or not (HHS, 2006).

![Moon Thumbnails](image)

**Figure 24:** When one of the thumbnail images is clicked on the left, a new window pops up with a larger image and a brief description. This also offers a high resolution jpg file of the same image (HHS, 2006).

Using Images to Facilitate Learning

To facilitate learning, it is practical to use images rather than text whenever possible (Figure 25). The superiority of pictures over text in a learning situation appears to be strong (HHS, 2006).

![If There Is Fire](image)

**Figure 25:** These illustrations facilitate faster learning of key concepts (HHS, 2006).
4.1.14 Writing Web Content

Content is the most important part of a web site. If the content does not provide the information needed by users, the web site will provide little value no matter how easy it is to use the site.

Making Action Sequences Clear

When describing an action or task that has a natural order or sequence (assembly instructions, troubleshooting, etc.) the content should be structured so that the sequence is obvious and consistent (Figure 26) (HHS, 2006).

![Pizza order example](image)

*Figure 26: The numbers and the steps make the action sequences very clear (HHS, 2006).*

Avoiding Jargon

Words that typical users may not understand should not be used. Terminology plays a large role in the user's ability to find and understand information. Many terms are familiar to designers and content writers, but not to users. To improve understanding among users who are not familiar with the jargon term, it may be
helpful to put that term in parentheses. A dictionary or glossary may also be helpful for users who are new to a topic (HHS, 2006).

**Defining Acronyms and Abbreviations**

Unfamiliar or undefined acronyms or abbreviations should not be used on web sites. Acronyms and abbreviations should be used sparingly and must be defined in order to be understood by all users. It is important to remember that users who are new to a topic are likely to be unfamiliar with the topic’s related acronyms and abbreviations (Figure 27) (HHS, 2006).

![Figure 27: Undefined acronyms on a homepage may leave users confused regarding the site’s contents or purpose (HHS, 2006).](image)

**Limiting the Number of Words and Sentences**

To optimize reading comprehension, it is practical to minimize the number of words in sentences, and the number of sentences in paragraphs. To improve readability of prose text, a sentence should not contain more than twenty words and a paragraph should not contain more than six sentences (HHS, 2006).

**Using Active Voice**

It is best to write sentences in active rather than passive voice. Users benefit from simple, direct language. Sentences in active voice are typically more concise than sentences in passive voice. Strong verbs help the user know who is acting and what is being acted upon (HHS, 2006).

*Example:*  
Active voice example: John hit the baseball.  
Passive voice example: The baseball was hit by John.

**Writing Instructions in the Affirmative**

As a general rule, instructions should be written in affirmative statements rather than negative statements. When giving instructions, it is better to tell users what to
do, rather than what to avoid. If the possibility of making a wrong step is high or the consequences are terrible, negative voice may be clearer to the user (HHS, 2006).

4.1.15 Search
Many web sites allow users to search for information contained in the site. Users access the search capability by entering one or more keywords into a search box.

Making Upper- and Lowercase Search Terms Equivalent
User-entered upper- and lowercase letters should be treated as equivalent when entered as search terms. For example, ‘FORCE,’ ‘Force,’ and ‘force’ should be recognized and accepted equally by the web site (HHS, 2006).

Providing a Search Option on Each Page
A search option should be provided on each page of a content-rich web site and on all pages where it may be useful. Users should not have to return to the homepage to conduct a search (HHS, 2006).
4.2 Manuals

Manuals are Not Novels. Manuals are more like guidebooks or cookbooks. People usually use the manual when they are in a hurry, needy or desperate to solve a technical problem. The reading process of a manual is not linear- and not neat. Readers of the manual are users of the product. They do not read for the act of reading itself. They read to help themselves do something with the product they can’t do by themselves (or by asking someone else) (Robinson & Etter, 2000).

4.2.1 Strategies for a Well Structured Manual

Giving Cues
Cues let the users know where they are and where they can go in a manual. Some helpful cues are:

- Table of content and Index
- Headings (of sections, of subsections, of steps)
- Overviews/introductions and summaries
- Parallels, series, comparison-contrast
- Numbering of steps
- Running visuals

(Robinson & Etter, 2000).

Repeating What is Important
What is important in a manual can be emphasized by giving it higher-level headings, by putting it first, talking more about it or using typographical cues such as boldface, centering, or white space (Robinson & Etter, 2000).

Building Doors and Exits
When writing a manual it is important to provide access, facilitate flow, and create movement through the information in the manual. Writing short, focused, verb first and active voice sentences help users to understand the steps easily. This means that users can easily enter and easily exit the door if the manual could be considered as a house with several doors and exits. Since the reader is often using the manual and working with the product at the same time, finding his or her place and moving from place to place easily are very important (Robinson & Etter, 2000).
Reducing text
Whenever possible, the amount of verbal text should be reduced in the manual. It is important to focus the reader’s attention on need-to-know information only and make it as easy as possible for them to move through – and out of – the document. Text can be reduced in a number of ways:

Going visual
- Using visuals to complement and/or replace text
- Using charts, tables, graphs, especially for process flow and troubleshooting.

Going for the verb
- Going short in paragraphs and sentences
- Using active-voice/verb first, (verb the text).

Going vertical
- Making lists
- Making more lists

The list strategy, in particular, is one of the most valuable tools. The horizontal arrangement makes instructions more difficult to follow. It is much clearer to go vertical (Robinson & Etter, 2000).

Repeating What is Important – Again
If the information is vital for safe and effective use, it is important to be repeated. Since the users are jumping into and out the manual as they work with the product, and skipping back and forth though the sections, they need to be reminded of the vital information. Repeating need-to-know information is helpful to users because it focuses their attention and saves them time looking back through previous sections for what they need now (Robinson & Etter, 2000).
4.2.2 User Manual, Online Help and Tutorials

There are different ways of providing guidance to users online. Most forms of paper manuals exist online, but popular variations include:

*Online manual:* An electronic form of complete paper manuals that cover the interface features. Online manuals make the text more readily available, searchable, and up-to-date, but they may be difficult to read, annotate and absorb.

*Online help:* Brief descriptions of specific topics to help users deal with the problems when they come up. Online help can provide indexes of terms, keyword searches, step-by-step guidance and access to complementary web information.

*Online tutorial:* An online training environment that uses electronic media to teach beginners by explaining objects and actions through textual descriptions, graphical imagery, and interface screen grabs. The scope of the tutorial can vary greatly, from brief two-minutes introductions to week-long computer-based training courses (Schneiderman & Plaisant, 2005).
5 Current State Description

This chapter presents different software tools that are used within the company. All the main functions of the user manual have also been explained in section 5.2.

5.1 The Software Tools

SKF has one of the most comprehensive sets of modelling and simulation packages in the bearing industry. The SKF Engineering & Research Centre plays a crucial role in developing and supporting a range of programs suitable for all SKF applications.

The software tools range from very advanced to expert systems and tools for basic application engineering studies. The analysis capabilities that can be provided range from static analysis and dynamic analysis to analysis in the area of noise & vibration, life, durability, wear, and friction.

5.1.1 Orpheus Platform

Orpheus platform is a calculation program that is developed within SKF. On this platform several calculation tools exist. Orpheus, SKF bearing beacon (SKFbb), SWEEP, SleWind are four different tools developed on the Orpheus platform.

*Orpheus* is the main program that contains all functionality of all combined tools developed on the Orpheus platform.

*SKF bearing beacon (SKFbb)* is the basic application engineering calculation tool that provides the basic functionality for Application Engineers to investigate the performance of SKF products in customer applications.

*SWEEP* is a special calculation tool developed for the Automotive Division to investigate the performance of HBU bearing units. (HBU = Hub Bearing Unit). Hub Bearing Unit is a car wheel bearing.

*SleWind* is a special calculation tool developed for the Wind energy segment within SKF, which provides special functionality to investigate slewing bearings. (Slewing bearing is the wind blade pitch bearing).
SKF bearing beacon (SKFbb) was created in 2004. In 2005 Finite Element Method functionality (FEM) was added to it, which resulted in having the capability to solve more advanced problems. In 2006 SWEEP, Sophisticated Wheel End Engineering Program, was launched, and in 2008 SleWind.

With the launch of version 2.2.0 of (SKFbb)-Orpheus, all separate tools developed on the Orpheus platform, that means SKFbb, SWEEP, SleWind and Orpheus, were combined into one single software tool. This software tool consists of a basic program, similar to SKFbb, plus a number of modules, where each module has its specific focus area with its own functionality.

Both SKFbb and Orpheus, as well as the combined new single software tool are developed by SKF's Research and Development Centre – ERC in the Netherlands.

5.1.2 SKFbb-Orpheus

SKFbb-Orpheus is a high level, general purpose analysis tool for rolling bearing applications. It can be used to analyse many different bearing arrangements and applications. This is the main tool for advanced application analysis used by application- and development engineers in SKF. Some examples of what the software can calculate are:

- Loads and displacements in a system of bearings
- Contact pressure and subsurface stresses
- Advanced bearing fatigue life
- Advanced performance of bearings in thin-walled housings (flexibility)
- Bearing friction torque
- Static, modal, rotor dynamic, transient and thermal analyses

This program is divided into 13 modules with different functionality. Each module requires special training. Depending on the training level, the user has access to different modules and can calculate different aspects of the bearing performance. The modules are:
The support is provided by Engineering Knowledge Services (EKS).

SKF bearing beacon is used by more than 500 users within SKF at product development centres, product engineering and application engineering. The Orpheus team continuously updates the software to add new functionality, increase accuracy and reduce calculation time.

With the launch of version 3.0 SKF bearing beacon will change name to SKF Application Simulator and Orpheus to SKF Advanced Simulator.

### 5.1.3 SKF Bearing Simulator

The SKF Bearing Simulator is an easy-to-use module of the SKF Simulator platform for single bearing analysis.

The user can perform fast analysis of:

- Monte Carlo clearance
- Fatigue life
- Friction (GC6000 model)
- Mounting forces
- Fretting
- Risk for creep
- Contact pressure
- and much more...

### 5.1.4 SKF Spindle Simulator

SKF Spindle Simulator is an advanced simulation software program for the analysis of spindle applications. It has been designed based on the SKF Simulator platform.
Some examples of what the program can calculate are:

- Bearing loads and displacements
- Fits & Bearing clearance
- Stiffness matrices
- Spin to roll ratio
- Eigen frequencies
5.2 The User Manual

The user manual is a web-based manual that in the end should contain all the information and instructions needed to use the SKF software tools (Figure 28). The EKS employees created this manual themselves. The manual is not complete, since it is constantly being updated and developed.

![Main Page of the EKS user manual](image)

**Figure 28:** The Main page of the EKS user manual

The user manual has two different environments, the development and the production environment. The development environment is a testing field which is used to analyse if a new version of the software manual is approved and good enough. Only EKS employees are able to see and make changes in this field. The EKS employees move the information from the development environment to the production environment when a new version of the software is released. When the information moves to the production environment, all users will have direct access to it.

Inside the user manual there are some main links that guide the users through the manual (Figure 29). The most important ones are:
5.2.1 Theory

(Theory) contains all the theory a user needs to solve a mechanical problem. It is divided into two main parts: General theories and more in-depth theories that are specific for each module. This theory part is written by EKS. It is a simplified version of (The Orpheus Reference Manual) which contains complicated theory explanations, especially for the average user.

5.2.2 How To’s

The How To’s is a link which is located in the user manual’s main menu bar. It helps the user to understand, relatively quickly, how to use different functions of the program. Its purpose is to readily:

- Give examples of how applications can be modelled,
- Give information about things that are not directly related to the functions and input windows of the software,
- Give examples of features and how they can be used in specific applications,
- Give information about small services that can help the user,
- Give warnings about traps that are easy to fall into in the modelling work.

5.2.3 FAQ

FAQ is a link in the user manual’s main menu bar where users can find Frequently Asked Questions regarding the SKFbb-Orpheus software.
5.2.4 Training
Training is another link in the user manual’s main menu. It contains information, examples and tasks for users who want to get a license for specific software modules. Depending on their work-role the users can get several licenses.

When a user wants to get a certain license, he/she needs to go through certain steps that are explained under the Training’s link. Users have twenty one days to finish the training and get the license.

There is both face-to-face and distance training. The face-to-face training occurs in classes and the users have access to a handbook. Users who do the distance training have to use the web-based manual to complete their tasks. If they face any problems with the tasks, they can then contact EKS for further help by using a web based support tool called EKS - Case Log.

5.2.5 The Reference Manual
The Reference Manual contains more in depth theory. It is written by the department of Modelling & Simulation (M&S) and is of a higher level of difficulty. Some theoretical components are password protected and are not allowed to be published to the end-users. Only EKS and the developers at the department of M&S have access to them.

5.2.6 The Search Engine
There is a Search Engine which is placed under the user manual’s main menu (Figure 29). When the users need to search for the information more quickly, they can use the search engine. But they need to type the exact word they are seeking for without any misspelling.

5.2.7 EKS - Case Log
EKS - Case Log is a kind of mailbox that users can use to contact the EKS-support group. They can use it either when they have problems in solving a task, or when they just want to give feedback about the manual. Strangely, there is no direct link to the (Case Log) from the user manual. Users need to go through the EKS homepage to be able to access the Case Log link.
6 Future Description

This chapter presents all the new plans for the development of the software tools and the user manual.

6.1 The Software Tools

Since the software tools are expanding extremely quickly, the department has decided to divide the software into three main groups; the SKF Developer, the SKF Designer and the SKF Simulator.

6.1.1 The SKF Developer

The SKF Developer will be used by Research and Development (R&D) and the Development Centres (DC) which cooperate closely with each other.

R&D is leading the development work. They form the basis for new standards, products and solutions in the SKF world. They also do research and develop theories in a very general way, for example friction theory. DCs take the information from R&D and apply it to develop design rules, for example. The development that DCs do is very specific, for example, the development of raceway descriptions for a specific bearing type. R&D and the DCs have access to SKF Developer, SKF Designer and SKF Simulator (Figure 30).

<table>
<thead>
<tr>
<th>R&amp;D and DC</th>
<th>SKF Simulator</th>
<th>SKF Designer</th>
<th>SKF Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Engineers</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ECS &amp; AE</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Figure 30: The table shows what departments have access to SKF Simulator/Designer/Developer.

6.1.2 The SKF Designer

With the design rules developed by DCs, the product engineers develop product ranges. They create finished products for manufacturing. They also publish all the data in a general catalogue (GC6000). The department of product engineering will be using the SKF Designer software and manual in the future. They will also have access to the SKF Simulator but not to the SKF Developer (Figure 30).
6.1.3 The SKF Simulator

The SKF Simulator will contain all the software that deals with analysis and simulation. SKF Simulator will have two versions, the internal and the external. The internal version will be used by the department Engineering Consultant Services (ECS) and Application Engineers which use the products from the General Catalogue (GC6000). They will only have access to the SKF Simulator and not to the SKF Designer or Developer (Figure 30).

The external version will be very limited and will be used by the SKF’s external customers.

All the software tools will have a proper common name to make it easier for the user to recognize that they are under the same platform. All software tools starts with SKF, which follows by a descriptive name and then Simulator/Designer/Developer. For example the SKF bearing beacon (SKFbb) will change its name to SKF Application Simulator.

6.2 Merging Theories

The theory in the user manual, which is written by EKS, and the in depth theory in the reference manual, which is written by M&S, will merge to one theoretical component. M&S will be the only writers of this merged theory and they are required to write an easy-to-understand theory description.
7 Analysis and Problem Determination

To be able to determine the problems in the web-based manual, it was necessary to interview the EKS employees, in order to have a better understanding of the manual and to know what was missing. The next step was to use the cognitive walkthrough method to observe the manual as a new user. And finally, the last step was to find out what the end-users think about the manual and what problems they face when using it.

7.1 The Interview

The EKS employees were interviewed separately to understand what problems and limitations they experience when writing the manual. Several meetings have also been organized to discuss the important points.

EKS employees have difficulties in writing the manual, because of the limitations in the Wiki program, which is quite similar to Wikipedia. They also use the HTML-coding to write, make tables, place pictures, edit pictures/tables/text etc., which is very frustrating and it takes very long time to do each action.

7.2 The Cognitive Walkthrough

There are currently some weak points in the manual. After using the manual for testing, some points were very annoying, which can make users lose focus, give up quickly and, in the best of cases, contact the support group. The following issues were the most significant ones:

- On the main page the user can see three pictures in the middle of the page (Figure 31). Since the pictures and their positions in the middle of the main page attracts attention more than the text does (HHS, 2006) it makes the users think the pictures are important and they will automatically click on them. But in this case, the pictures are not links and when the user clicks on them he/she will get information about the picture’s size and type, etc., which is not what the user expects to find (Figure 32).
Welcome to the EKS user manual!

There are 3 different start-up modes available today. Below you find quick-links to the "User Guide" of each mode. The same links are found in the navigator area to the left. Please note that there is a more general Theory section as well.

Click on the text! The pictures are not linked.

![SKF Bearing Simulator](image1.png)

![SKF Spindle Simulator](image2.png)

This site is powered by:

![EKS Engineering Knowledge Services](logo.png)

Figure 31: The main page, the three icons in the middle of the page make users think that they are links.

Figure 32: When clicking on a picture on the main page
- Even though there is text in the middle of the page that informs users that the pictures are not linked, the users will click the pictures. The text is very small and in italics, so it will not be detected (Figure 33).

**Figure 33:** The text informs that the pictures are not linked, but the user won’t pay attention to it.

- The three links in the middle are repeated in the main menu along with other links. Sometimes it is practical to repeat important links, (HHS, 2006), but in this case the main links have been repeated on the same page. This confuses the user as to where to click first (Figure 34).

**Figure 34:** The links are repeated on the same page, this makes the user confused about where to start.
When clicking on a link in the **content menu**, which is located at the top of each section (Figure 35), the system jumps down to the related heading. However, the user won’t see the menu again and there is no direct link back to the content menu (Figure 36). If the information is not what the user is looking for, the user must either scroll up to the content menu and choose another link or scroll around and search for the desired information manually.

**Figure 35:** The content menu

**Figure 36:** When clicking on the content menu
The headings at different levels are not very different from each other. It is not easy for the user to distinguish the levels of the headings only by looking at them. The headings also miss section numbers, which are very useful for finding out the current section (Figure 36).

There are some tables with yellow backgrounds and blue text (Figure 37). Not all the texts in blue are links here, although blue text usually gives the user a signal that it is a link.

Many links and lots of information fill the first page of the manual. That makes it difficult to know where to begin (Figure 38).
There are also links that are inaccessible for the end users, but they can see them at all times (Figure 39).

The logo is not very clear and is not shown on every page (Figure 40).

There is no indication of where the user is in the manual.

The structure of the manual is not very clear.

There is no clear link to the EKS - Case Log in the user manual.

There is no direct link to the User Manual from the EKS homepage.
7.3 The Survey

To be able to understand what problems the end-users have when using the manual, an electronic survey was sent to 400 SKF employees around the world.

Seventy-five users responded to the survey which was unusually few. Half of the respondents were from Western Europe and no one from India and the Middle East responded to the survey (Figure 41). EKS was expecting more responds especially from India.

![Pie Chart: The Locations](image)

*Figure 41: Pie Chart: The Locations*

The user manual

More than 60% of the users have difficulties in finding information in the user manual. Some of the main reasons are:

- Poor user interface
- Not enough examples
- Not enough cross-references
- No indication about where they are in the manual
- Not enough graphics
Some other comments received from the users are:

- Difficulties in finding information, because things are only defined rather than being explained with help of examples.
- A lot of information is missing.
- The user has to go to the Orpheus homepage manually to search for the information.
- The user gets easily frustrated when he/she cannot locate the information.
- The user has difficulty to see where he/she is in the structure.
- The user likes to see more background information concerning the user theory.
- It is not very clear where to find specific information. The user needs to go through some unnecessary steps and links to hopefully find the information he/she is looking for.
- Some chapters are incomplete.
- The user needs clearer examples.
- The user is unable to easily locate where the information is available. The user must go through a lot of clicking before finding it.
- Information is missing in chapter (Dynamic).
- The user interface is confusing.
- Information about (load at offset) is missing.
- The user would like to find background information. Many details are missing.
- The user needs more in-depth information.
- The user needs more examples in the user manual.
- Some blue texts are no links, which make the user confused.
- Access to more links that are related to what the user is looking for.

Thirty-five percent of the respondents can find the information they need in less than 5 minutes. But almost 60% need 30 minutes to find the information (Figure 42).
The Reference manual

More than half of the respondents do not know that there is a reference manual and consequently they do not use it. More than 80% do not find all the information they need in the reference manual. A large number do not think that the manual has a clear layout and they also think that it is unclear how to link back to the user manual after they found the information.

Theory

It is not clear enough where to find a specific theoretical component, in both the user manual and the reference manual. Over 30% felt that both the user manual and the reference manual contain a lot of difficult terminology and 90% would like to have access to an acronym dictionary.

Training

Nearly 30% of the respondents do not know where to find information about what kind of trainings EKS offers. And almost 20% do not think that the information covers all the steps they need to begin a course.

Some other comments received from users who participated on the course/courses regarding the quality of the courses were:

![Pie Chart: The amount of time that it takes to find specific information in the manual.](image)
• The training is more or less a click there, then click there… training. The user needs to understand the theory behind the software and also the explanation of the result and the reasons behind it.
• The information, theory and examples are very poor and the user thinks that it would be better to have two levels of knowledge depth.
• The user needs more information that explains what they can do to deal with the problems they meet while using SKFbb.

The How To’s
Eighty percent of the respondents do not use the How To’s. Nearly 50% of the people who are using it do not think that the links are well-organized and over 40% are missing information in the How To’s.

The Search Engine
More than 55% of the respondents do not know where the search engine is located in the manual. Twenty-five percent of the users who are aware of the existence of the search engine, do not use it at all and 40% do not get good alternatives/results when using the search engine.

The FAQ
Nearly 50% of the respondents do not know that there is a FAQ in the user manual and more than 60% of those who know do not use it. But 66% think that the information in the FAQ is useful. On the other hand almost 50% are missing information in FAQ.

One comment in this section is that the user would like to see more questions in the FAQ.
8 Requirement specifications

Out of the information collected from the interviews, the cognitive walkthrough and the survey, a requirements list was created. This requirements list was sent to the department of Modelling and Simulation (M&S), which in turn has the responsibility to find a proper program that matches all or most of the requirements.

8.1 The Outline

The requirements were divided in two main groups. The first group (Software Development Tools) include the responsibility of the department of Modelling and Simulation (M&S) and is all about the software development tool. The second group (User Manual System) contains the usability related requirements which in turn can be divided into three main categories, i.e. the content, search problems and the layout and structure issues (Figure 43). The second group include the responsibility of the Engineering Knowledge Services (EKS) department.

The content was divided in two categories, the Detail level and Amount. The Detail level deals with the improvements to the manual and the Amount is about adding content.

Figure 43: The Requirement specification's chart
8.1.1 Software Development Tools

The requirements related to the software development tools which were directed to M&S were:

- A smarter search engine that gives more alternatives
- Editable templates which are automatically updatable.
- Pop-up info (when moving the mouse pointer on an acronym)
- An indication of where the user is in the structure (structure tree)
- Access to a Text Editor
- Access to a Picture Editor
  - Easy to change the images
  - Easy to change the image size
  - Easy to adjust the images
  - Easy to update all images
- Access to a Table Editor
  - Easy to enter number of columns and rows of tables
- Separate components in manual (Easy to place circles, arrows etc. on the picture)
- Possible and easy to link to different pages
- An easy way to print the web page with suitable margin
- Version history – Content Management System
- The possibility of having content in draft (not published, i.e. not visible to the user)
- Keywords on page/section (automated)
- Statistical capabilities (most visited pages etc., secondary requirement)
- Access rights
- Page access and visibility (and/or)
- Chapter/section access and visibility (and/or)
- Paragraph access and visibility
- Link behind a picture
- Links that are regulated by access rights (Sometimes users can see a lot of links that they are not authorized to enter – unnecessary links that they cannot use!)
- Making upper- and lowercase search terms equivalent
8.1.2 User Manual System

The user manual system contains all requirements that deal with the content, search problems and the layout and structure issues, in other words, the usability requirements that have no specific relation to the software development tools or programming issues (Figure 43).

Content

The content which is the EKS responsibility is divided into two different categories, the Detail level and Amount (Figure 43).

Detail Level

The requirements related to the Detail Level in the content were:

- More in depth information in the User Manual
- Completed chapters in the User Manual and Training section (Missing information)
- Clearer examples
- Access to an acronym dictionary
- Access to relevant links
- An explanation of the difficult terminologies
- Clearer information about the steps the user needs to make to begin a course.
- Better explanation in the Training section
- Better examples in the Training section
- Richer content information, theory and examples in the Training section
- More questions in the FAQ section

Amount

The requirements related to the Amount in the content were:

- More examples
- More pictures
- More explanations
- More information in the User Manual, How To’s and FAQ sections
- More background information
Search - Find – Locate
The requirements related to the Search-Find-Locate were:

- Finding information easily in the User Manual, Reference Manual, Training and the How To’s (logical)
- A smart orientation system
- More cross-references
- A more compatible search engine

Layout - Structure
The requirements related to the Layout-Structure were:

- Simple, clear and understandable layout/structure
- Reducing unnecessary steps to find information
- No blue texts which are not links
- Better organization of the links in the User Manual and How To’s
- Better presentation of the Reference Manual, the How To’s, the Search Engine and the FAQ (some users did not know that they existed!)
- Better user interface
- Better categorization of the information

8.2 Requirement Specifications with Priorities for the Software Development Tools
To make it possible for M&S to find an optimal program, it was necessary to divide the requirement specifications into three levels, High, Average and Low priority.

8.2.1 HIGH PRIORITY

- Editable Templates which are automatically updatable.
- Access to a Text Editor
- Access to a Picture Editor
  - Easy to change the images
- Easy to change the image size
- Easy to adjust the images
- Easy to update all images

- Access to a Table Editor
  - Easy to enter number of columns and rows of tables

- Possible and easy to link to different pages

- Version history – Content Management System

- The possibility of having content in draft (not published, i.e. not visible for the user)

- Access rights
  - Page access and visibility (and/or) (High Priority)
  - Chapter/section access and visibility (and/or) (Average Priority)
  - Paragraph access and visibility (Low Priority)

- Link behind a picture.
- To allow restriction of access to certain pages (under construction)

### 8.2.2 AVERAGE PRIORITY

- Indication of where the user is in the structure (tree structure)
- Separate components in manual (Easy to place circles, arrows etc. on the picture)
- Easy to print the web-page with a suitable margin
- Making upper- and lower case search terms equivalent.

### 8.2.3 LOW PRIORITY

- A smarter search engine - gives more alternatives
- Pop-up info (when moving the mouse pointer on an acronym)
- Keywords on page/section (automated)
- Statistical capabilities (most visited pages etc., secondary requirement)
- Links that are regulated by access rights (Sometimes users can see a lot of links that they are not authorized to enter – unnecessary links that they cannot use!)
- Monitor the access to the web-site
- Descriptive pop-up information of what is hiding behind links.
8.3 Software Tools that Meet M&S’s Requirements: Alfresco and Confluence

M&S found two programs that might fulfill the most important parts of the requirements list, Alfresco and Confluence. Alfresco offers document management, web content management, records management and collaboration. Confluence offers almost the same functionality as Alfresco, but there are some differences in what they can accomplish when it comes to the requirements list. M&S compared these differences and reported them in a matrix table (McNabb, 2010; Marty, 2010).

8.4 Comparison of Alfresco and Confluence Software Tools

To control what the Alfresco and Confluence programs can accomplish, M&S compared them with respect to how they meet the requirements:

**HIGH PRIORITY**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Alfresco</th>
<th>Confluence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editable Templates that is automatically updatable.</td>
<td>Yes</td>
<td>?</td>
</tr>
<tr>
<td>Access to Picture Editor</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>o Easy to change the images</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>o Easy to change the image size</td>
<td>No</td>
<td>?</td>
</tr>
<tr>
<td>o Easy to adjust the images</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>o Easy to update all images</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to Text Editor</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to Table Editor</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>o Easy to enter number of columns and rows of tables</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Possible and easy to link to different pages</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Version history – Content Management System</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Possibility to have content in draft (not published, i.e. not visible for the user)</td>
<td>Yes</td>
<td>?</td>
</tr>
<tr>
<td>Access rights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Page access and visibility (and/or) (High Priority)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>o Chapter/section access and visibility (and/or)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>(Average Priority)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>o Paragraph access and visibility (Low Priority)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Link behind a picture.**
- Yes
- Yes

**Allows to restrict access to certain pages (under construction)**
- Yes
- ?

### AVERAGE PRIORITY

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Alfresco</th>
<th>Confluence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication of where the user is in the structure (tree structure)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Separate components in manual (Easy to place circles, arrows etc. on the picture)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Easy to print the web-page with suitable margin</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Making upper- and lower case search terms equivalent.</td>
<td>Yes</td>
<td>?</td>
</tr>
</tbody>
</table>

### LOW PRIORITY

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Alfresco</th>
<th>Confluence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smarter search engine - gives more alternatives</td>
<td>Normal search available</td>
<td>Normal search</td>
</tr>
<tr>
<td>Pop-up info (when moving the mouse pointer on an acronym)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Keywords on page/section (automated)</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Statistical capabilities (most visited pages etc., secondary requirement)</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Links that are regulated by access rights (Sometimes users can see a lot of links that they are not authorized to enter – unnecessary links that they cannot use!)</td>
<td>Should check</td>
<td>Should check</td>
</tr>
<tr>
<td>Monitor the access to the web-site</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Descriptive pop-up information of what is hiding behind links.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

On the basis of the comparison M&S recommended Alfresco as a tool for development of the new on-line manual system. Even though Alfresco did not fulfill all the requirements, most of them were.
9 Possible Solutions for Design of the User Manual System

The results of the interviews and the survey provided information on what kind of problems the end-users were facing and gave support in the sketching process. These sketches were constantly presented to the EKS-employees for further improvement and to ensure that all the aspects of the manual had been covered. This chapter includes all the sketches and concepts that have been produced in this study.

9.1 Sketches & Ideas

The following section explains in detail all the sketches that have been produced with the intention to improve and develop the EKS manual.

9.1.1 Sketch 1

Since the users had difficulties with finding information, it was necessary to find an optimal and logical navigation system.

The first sketch (Figure 44) shows a horizontal navigation system combined with a drop-down menu structure. The main menu is at the top. When the user clicks on a tab in the top menu bar, all the submenu items appear on the second row and the border lines turn red to mark the area that have been chosen (Figure 44). When the user clicks again, the items of the third level appear in a drop down menu.

The Logo

The logo is positioned on the top left side of the homepage and it will be located in the same position on all pages.

The layout

The content menu is placed on the left side. The design of the content menu is inspired of the logo. The right part of the logo is similar to the information entry’s sign (i). When the user clicks on a link in the content menu the information will
appear in the middle of the page. If there are pictures related to the text, they will be placed on the right side of the page.

9.1.2 Sketch 2
Since the users generally look at the top centre of the web page first (HHS, 2006), the important and main items that are frequently used are placed at the top middle part of the navigation tabs (Figure 45).

Figure 44: Sketch 1, Vertical navigation system combined with drop-down menu

Figure 45: Sketch 2, Important links at top middle part
9.1.3 Sketch 3
These sketches represent some ideas taken from the SKF-ball bearing and the Orpheus logotype to design the main page (Figure 46).

![Figure 46: Sketch 3, Inspirations taken from ball bearing and the Orpheus logotype.](image)

9.1.4 Sketch 4
In the following sketch there are some thumbnails of different navigation systems and layout.

A. Lists
To reduce clicking, it is sometimes good to show the entire submenu in lists (Figure 47A). But when there are long lists it will be difficult for the users to find the target information.

B. The Navigation System
When the user clicks on an item in the main menu at the top, the sub menu will appear on the left (Figure 47B). Two more levels can be added to the sub menu.
Figure 47: Sketch 4, Thumbnails of different navigation systems and layouts.
9.1.5 Sketch 5

Figure 48 is a Tree-Structured Navigation System. When the user clicks on an item in the left menu, the menu splits up in two parts and the sub links appear in a smaller font. When clicking on the target link, the information related will appear in the right area (Figure 48).

Figure 48: Sketch 5, Tree structure navigation system
9.1.6 Sketch 6

Some of the ideas from the previous sketches are combined in one navigation page to see if they work well together.

All of the web site’s support links, such as Log In and FAQ, are placed at the very top right side of the page. The logo is also placed at the top right side and will always be in this place on all navigation pages (Figure 49).

On the top left, the logo of the main software is placed to remind the user in what software manual he/she is working in.

The main menu bar is at the top left side. When the user clicks on one item the sub menu will appear in the left menu. The left menu is a tree-structured navigation system which contains a maximum of three sub menu levels.

Figure 49: Sketch 6, The navigation page
9.2 The Concepts

After making some sketches, several concepts of the main page were created. These concepts have been presented to both EKS and M&S partly through WebEx and PowerPoint presentations.

9.2.1 Concept Logo

In this concept the focus is on the Orpheus logo which is placed in the middle. All the main link-icons will be placed at the lower part of the main page (Figure 50). The support links are located at the top right side of the page.

![Concept Logo Diagram](image)

**Figure 50:** Concept Logo

9.2.2 Concept Square Wheel

In this concept the focus is on the link-icons. The icons are arranged in a circular path like a wheel. The idea of the wheel comes from the ball bearing’s motion. The
icons are grey (Figure 51). When the user moves the mouse pointer over an item, it turns coloured and a pop-up information text appears on the right side of the icon which describes the link’s destination (Figure 52).

**Concept 2:**
**SQUARE WHEEL**

![Concept Square Wheel, all icons are grey](image)

*There are some square shaped icons which are placed in a circular path like a wheel.*

**Figure 51:** Concept Square Wheel, all icons are grey

**Concept 2:**
**SQUARE WHEEL**

![Concept Square Wheel, the icons become coloured when moving the mouse pointer over them](image)

*When moving the mouse pointer over an icon, it turns coloured and an information text appears on the right side to describe where it links to.*

**Figure 52:** Concept Square Wheel, the icons become coloured when moving the mouse pointer over them.
9.2.3 Concept Ball Bearing

Because the manual is growing very fast, it was necessary to give the user the option to choose between the software manuals that will be available in the future. This selection can be done on the homepage before entering the navigation page.

The Design

In this concept, part of the ball bearing at the top left, acts as a reminder of SKF. When moving the mouse pointer over a ball in the bearing the ball and the attached link become coloured (Figure 53). And when clicking on a main link, the sub-links will appear in the form of a list to let users choose the desired manual.

The Logo

Only on the homepage, the logo will be located on the bottom right of the page to balance the ball bearing picture on the top left.

The Support Links

The support links will also be placed on the very top right of the webpage because on most homepages the support links are usually located at the top right.
9.2.4 Concept Part Logo

The Inspiration in this concept is taken from the Orpheus logotype. The right part of the Orpheus logo has an interesting shape. The circle at the top of the logo is similar to the information’s sign (i) and it even looks like a human working on a computer (Figure 54). That is why this concept got the name Part Logo.

The shape of the other lines on this page is inspired by the shape of the SKF Logo. Before the user makes any actions all the lines are grey. When the user clicks on, for example, the Simulator, the related line will turn orange and the sub links will appear below the Simulator. When the user clicks on the Designer link, the related line will become pink, and when clicking on the Developer link, the related line will become olive-green. If the user does not have access rights to the Designer and/or the Developer links, they will be inactive and grey.

Figure 54: Concept Part Logo
This chapter includes the selected concepts for both the main page and the navigation page.

### 10.1 The Main Page

The concept (Ball Bearing) has been selected from other concepts (Figure 55). The motivation for this selection lies in its simple design and its easily understandable navigation. The ball bearing on the left symbolizes toughness, mechanical environments and also acts as a reminder of SKF.

![Concept 3: BALL BEARING](image)

**Figure 55:** The selected concept, Concept 3 :Ball Bearing
A more realistic picture has been drawn up with help of the Visio program (Figure 56).

Figure 56: Concept BALL BEARING, created with the Visio program

10.2 The Navigation Page

The navigation system in figure 57 has been selected from all other sketches. It contains all the aspects of the manual. The user knows where he/she is at all times, for example:

- The picture on the top left side indicates that the user is in the SKF Spindle Simulator,
- The selected item in the main menu at the top is very clear so that the user can easily see that he/she is in the User Guide,
- On the left menu, an arrow indicates very clearly where the user is in the navigation system.

The user can easily click and go back to the other items by clicking once.
The selected navigation system has also been drawn up in the Visio program to get an idea of how it would look like in reality (Figure 58).
11 Further Development of the Selected Solution

Due to the employees’ desire, some changes have been done on the selected concepts. These modifications are presented in this chapter.

11.1 The Main Page

There have been discussions on what type of roller bearing that would be used for the roller bearing picture. Several options have been presented to the EKS to select the one that suits their manual best.

**Option 1**

![Figure 59: The main page, Option 1](image)

The roller bearing in option 1 was suitable, but some employees preferred a sketch version of it rather than a realistic one.

This type of bearing is not only produced in Sweden, but also in Great Britain. The bearing in option 1 is the one that is produced in Great Britain (Figure 59). This was the second point most employees reacted to.
Option 2

The bearing in Option 2 is produced in Germany, so it was also a big no.

Option 3

Figure 60: The main page, Option 2

Figure 61: The main page, Option 3
Option 3 has been edited in Photoshop to look like a sketch. It received an approval from several employees, but when they had to choose between option 3 and 4, the choice became more difficult.

**Option 4**

![Figure 62: The main page, Option 4](image)

Option 4 has also been edited in the Photoshop program. The idea was that it begins as a sketch on the left and eventually becomes a more realistic high-tech roller bearing. This time most of the EKS employees agreed and chose option 4 for the Main Page.

### 11.2 The Navigation Page – (Second Page)

Some small changes have also been made on the navigation page. These changes affect the menus, the pictures at the top and the breadcrumbs. The changes can be seen in figure 63 and 64.
Figure 63: The navigation page, Before changes

Figure 64: The navigation page, After changes
Because the designs of the main page and the navigation page are very different, it was necessary to have something to remind the users of the design of the main page as well. That is why the roller bearing picture of the main page has been placed on the top left side of the navigation page. Most users consider the pictures on top left clickable. That is why it is also a link to the main page even though there is a separate link with the name Main Page at the very top right of the navigation page.

The design of the SKF Spindle Simulator has been changed. In the new design the focus is on the Simulator to inform the users that they are in the Simulator Group.

The tab, User Guide, has now been changed to User Manual. The text conveys clearer information to the user on where the actual manual can be found on the webpage.

The colour of the chosen tab’s name was changed from blue to grey. This was because blue text is usually considered as a link and in this case it is not a link. The grey colour ensures that it is only informative text.

The breadcrumbs navigation has been added to this page to increase the usability of the interface.

The pictures were originally positioned on the right side of the page (Figure 63), but some monitors and screen resolutions force the user to scroll horizontally to make the pictures visible. That is why the position of the pictures has been changed to below the related text.
12 The Final Solution

Option 4 has been chosen because there is a good contrast in the colours (the black and white), as well as the contrast between the sketch and the high-tech bearing (Figure 65). The blue light of the roller bearing also attracted the attention of most of the EKS employees.

12.1 Description of the Functions of the New Manual

Exactly how the new user manual works is presented in detail in the following sections.

12.1.1 The Main Page

Figure 65 shows the first page the users see, when they open the user manual either from the program's help function or from the EKS homepage.

Figure 65: The main page of the new EKS user manual
The main page has three main groups, SKF Simulator, SKF Designer and SKF Developer (Figure 65). Depending on the user’s access rights, these links can be either active or inactive:

- The users who have access to the SKF Developer will automatically have access to the SKF Designer and the SKF Simulator.
- The users who have access to the SKF Designer will also have access to the SKF Simulator, but not to the SKF Developer.
- And finally the users who have access to only the SKF Simulator, do not have access to the SKF Designer nor the SKF Developer.

The order of the groups seems to be the wrong way around, in other words, in the working process, the SKF Developer should come first, then the SKF Designer and then the SKF Simulator. But, because the SKF Simulator has many more users than the others have, it has been assigned to the first position (Figure 65).

Figure 66: The main page of the new EKS user manual, when moving the mouse pointer

When moving the mouse pointer over one of the main links, it turns blue (depending on the user’s access rights). The roller in the bearing, attached to the link, will also be highlighted in blue (Figure 66).
When clicking on the SKF Simulator a drop down list will appear on the screen (Figure 67). The list contains all the manuals of the different simulator programs that are available in the simulator group.

Figure 67: The main page of the new EKS user manual, when clicking on the Simulator link.
When moving the mouse pointer over each link in the list, it turns blue and bold (Figure 68).
The user can choose here what part of the simulation he/she wants to visit. The names in the list exist in three different parts:

SKF + Name of the work the program does + Simulator/Designer/Developer

There is also a general menu bar at the top of the webpage (Figure 68 & 69). This menu bar will be presented on all pages in the manual.

The menu bar contains the:

- Main Page
- FAQ
- Support
- Log In

Figure 69: The main menu bar
The *Main Page* links to the first page of the manual. The user will be able to come back to the first page anytime by clicking on this link.

The *FAQ* contains the frequently asked questions for all software tools.

The *Support* link can be used when the users need help with the software or when they want to give feedback. The support link contains a link to the EKS - Case Log, contact numbers and so on.

The EKS and M&S users need to log in to be able to make changes in the manual. The *Log In* link is made for this purpose.

To reduce the amount of clicking for the users, some shortcuts have also been placed in the main page (Figure 68 & 70). The links turn blue when moving the mouse pointer over them.

![Figure 70: The shortcuts on the main page](image)
12.1.2 The Navigation Page

When clicking on SKF Spindle Simulator this page will appear (Figure 71).

![The navigation page of the SKF Spindle Simulator](image)

**Figure 71:** The navigation page of the SKF Spindle Simulator

The roller bearing picture at the top left, reminds the user of the main page and at the same time shows which bearing has turned blue (in this case the first one, SKF Simulator). Both the roller bearing picture and the Main Page-link, at the top right, will link back to the Main Page. This assists users in reaching the main page in the way they are used to.

This area shows in which software tool the user is working. The light background picture is simply the Logo of the SKF Spindle Simulator. This field will change depending on what type of simulator the user has chosen (Figure 72).
This menu bar contains some important tabs that are the same in all simulator manuals. These tabs are:

- **Home** is the first page of the Simulator. It gives a short introduction to the program and its capabilities. When the user enters the navigation page, the Home tab will be selected from the beginning.

- **User Manual** contains the specific manual of the related simulation program.

- **Training** contains all the information and training material needed to help users to get a license for (in this case) the SKF Spindle Simulator.

- **Theory** contains both the associated theoretical component, in this case, SKF Spindle Simulator and even a link to all theories.

- **How To’s** contains related information on the specific program.

This is the logo of the whole Orpheus platform. It will always appear in the same position on all pages except for the main page.
When the User Manual-tab is selected, this page will appear (Figure 73).

When clicking on each tab, it will also appear in two other places, first in the heading of the left menu and as a breadcrumb.

When clicking on a tab, the related sub links appear in the left menu in a dropdown movement.
When moving the mouse pointer over each link in the left menu, a line will appear under the link to indicate its clickability (Figure 74).

When clicking on any link in the left menu, the information will be displayed in field [15]. The text information comes first, and then the picture follows beneath it.

The title has always its position in field [16]. Under the title there is a content link with a down arrow next to it. When clicking on the content, a list of clickable content will be displayed and the arrow will turn upward. This is to indicate that the user can close the content list by either clicking on the arrow or the content link.
When clicking on Single Bearing in the left menu, it becomes bold, the menu splits in two parts and the sub links appear in grey and in a smaller font. A grey arrow pointed upwards will also appear next to Single Bearing (Figure 75 & 76). When clicking on the arrow, the split parts will close and the arrow disappears (Figure 77).

![Figure 75: The navigation page, The User Manual, When clicking on a link in the left menu](image)

![Figure 76: When clicking on Single Bearing in the left menu](image)

![Figure 77: When clicking on the grey arrow](image)
When moving the mouse pointer over the new split menu, a grey line appears under the marked link to convey clickability (Figure 78).
When clicking on Single Bearing Report, it becomes bold and an orange arrow appears next to it (Figure 79). The related information will be displayed on the right side of the page.

When clicking on a link, it will also appear as a breadcrumb (Figure 79 & 80). The user can always click on the breadcrumb to move back a few steps in the manual.

The Search Engine is positioned at the top right part of the page (Figure 79 & 81). This is an optimal place for the Search Engine, because it is more visible and it’s even found at the same place on most web browsers. According to the survey there were some users who did not even know that there was a Search Engine in the old manual.
The tree-structured menu should have a maximum of 3 levels. The tabs in the top menu have already taken one level and with the tree-structure menu, a total of 4 levels will be available. When there are more than four levels needed, then the EKS-employees can use linkable lists (Figure 82).

There are several links under the Bearing Type. When the user clicks on an item in this list, the information related to it will be displayed further down on the same page.
12.2 Pilot Project

To make sure that the final layout is working without any problems, it was necessary to launch a pilot project to test all the aspects of the layout and the manual’s construction. This assists in receiving more feedback from the test-users and helps to improve the manual even more before publishing the site officially.

The Alfresco program was used for constructing a part of the manual for testing. The current version of the Alfresco-program had some limitations when it comes to designing the web site as desired. With help of the limited program functions and html-coding a light version of the requested design was built in a limited time. Therefore some parts of the webpage was missing, incomplete, inactive or not working as desired. But it gave an idea of how the web site would look like once completed.

12.2.1 The Homepage

Figure 83 is the first page of the EKS User Manual. It looks almost the same as the final design. At this stage, the shortcuts in the lower left and the main menu at top right were inactive. However, they will be active in the future.
Figure 83: The Pilot Project, The Homepage
When moving the mouse pointer over the SKF Simulator, it turns blue, but the roller attached to it does not turn blue (Figure 84).

Figure 84: The Pilot Project, The Homepage, When moving the mouse pointer over the SKF Simulator
The list that displays after clicking on the SKF Simulator is slightly different in design and position. The dots next to the list should be grey as well, and the list should be located more to the right to avoid interference with the SKF Designer entry when more manuals are added to the list (Figure 85).

Figure 85: The Pilot Project, The Homepage, When clicking on the SKF Simulator
When the user moves the mouse pointer over a link in the list, it turns blue except for the dot related to it. The SKF Simulator should remain blue, but in this case it turns grey again (Figure 86).

Figure 86: The Pilot Project, The Homepage, When moving the mouse pointer over the sub-links
12.2.2 The Navigation Page

The navigation page looks a bit different from the final design, mostly because it is incomplete (Figure 87).

![Figure 87: The Pilot Project, The Navigation Page](image)

The main differences to the final design are:

1. The colour of the main menu at the very top right should be grey as on the homepage.

2. The design of the menu below the logo is different.

3. The search engine is missing.

4. And last but not least, the left menu looks very different.

As mentioned, the pilot project is not yet complete. This is only a light version of how it could look like in the end. Furthermore, this version of the Alfresco program does not contain all the functions needed to make the desired design, but in the next version these functions will be available. With the launch of the next version
and with help of the html-coding and maybe Java scripting, hopefully the one-to-one version of the final design will be possible.
13 Discussion

- There are serious restrictions in publishing pictures on the web site. All pictures have to be approved by SKF. It was not easy to choose a picture for the design of the homepage. There are also some limitations in choosing colours, SKF has its own colour scheme and the designer is limited to choose from them.

- The logical order of the SKF Simulator/Designer/Developer on the homepage should be the other way around, but as the number of people who use the SKF Simulator is much greater than the number of users of the other two parts, it has been decided that the order shall be this way.

- Currently there are very few questions in the FAQ, that’s why it is practical to place them all under the general FAQ together with the support links at top right. However when more questions about different software tools will be added to the FAQ it will be more convenient to place a FAQ-link in the head menu bar at the top that will point only to those questions that are related to the current manual.

- In the survey, some users wished to see more background information concerning the user theory. But the end-users have not always the rights to retrieve that information because it is restricted.

- M&S had difficulties in finding a program that meets all the requirements concerning the design part. The main reason was lack of time and being busy with other projects and responsibilities. But most of the design part would be possible by html-coding, Java scripting and a professional web developer.

- The communication between the designer and the programmer was limited to phone, emails and web-ex programs, because of distance. It would be much easier if the designer and the programmer worked together in the same office during the design process. The designer would be able to ask the programmer if a design solution is possible in the sketching phase before putting too much time into it and develop it in computer programs. Besides,
working at different locations would increase misunderstandings between them.

- The outcome of the pilot project was not exactly as expected. The main reason was the short time M&S had to find a proper program, the limitation of the Alfresco program and the short time they had to build the webpage in addition to other projects which they were busy with.

- A light version of the pilot project was produced in order to be able to present the work and have an idea of how it would look like in the end. But there still remains a great deal of work to be done.

- Since the pilot project is not yet complete, it was not possible to make a usability test either. This will occur after finishing the pilot project.

- Alfresco will launch a new version of their program which will contain greater functionality and freedom to design the web site.
14 Recommendations

For the future work I suggest the following:

❖ Hiring a professional web developer to make the one-to-one copy of the final design. It always benefits the company to have a well designed and user friendly web site. This will increase the number of users wanting to use the web site and even gives the company credibility and a good name.

❖ Making a usability test before using the design. Trying to find the weak spots, working on them and make them as good as possible.

❖ Telling the users about the new web site way ahead of publishing. It would be useful to put a link to the old manual in the new web site because some users are used to the old manual even though it will be inferior to the new site in usability.

❖ Get feedback from the users about the manual through a questionnaire in order to check for the potential for further improvement of the web site.

❖ Put a visible and direct link from the EKS homepage to the manual.
Text books and Reports


Electronic Sources


[http://www.skf.com](http://www.skf.com)


**Software Used**

Adobe Photoshop

Microsoft Office Excel

Microsoft Office Visio

**Pictures Taken From**

Figure 1 – 2 http://www.skf.com/portal/skf/home/?lang=en&site=COM

Figure 3 http://www.usability.gov/pdfs/foreword.pdf

Figure 4 http://www.useit.com/alertbox/reading_pattern.html
Figure 5 – 27  http://www.usability.gov/pdfs/foreword.pdf

Figure 28 – 40  163.157.0.29:90/orpheusmanual/index.php5/Main_Page
Appendix

Appendix A – Gantt Chart (Time Planning)

Appendix B – The Survey Questions

Appendix C – The Survey Results
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Presentation

Appendix A
The Survey Questions

Dear Colleague,

To be able to improve the SKFbb software manual, we would appreciate if we could receive your opinion regarding the usability of the software manual.

The aim and scope of this survey is to create and develop an understandable and user-friendly manual for the SKFbb software.

The survey is completely anonymous and all answers will be treated with high integrity.

The survey will be available from today 2010-02-15 until 2010-03-01.

Thank you in advance for your feedback!

Kind regards

Ferdaus Najafi
Master Thesis Student at EKS (Engineering Knowledge Services)

Background

<table>
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<tr>
<th>Age: (20-30)(30-40)(40-50)(over 50)</th>
<th>Gender: (Male, Female)</th>
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</table>

1. In which part of the world are you located?
   (Africa, America – North, America – South, Asia – China, Asia – India, Asia – Japan, Asia – Other, Europe – Eastern, Europe – Western, Middle East, Oceania, Other)

2. How long have you been working within SKF?
   (1-3 year, 3-5 year, 5-10 years, over 10 years)

3. How long have you been using the SKF bearing beacon program?
   (Never, I’m a beginner, 1-2 years, more than 2 years)

4. How often do you use the SKF bearing beacon program?
   (Daily, Weekly, Monthly, Yearly, Never)
5. Which SKFbb License/ Licenses do you have?
   (None, Basic, Wheel-End, Math, Six Sigma, Friction, Flexibility, Standing Contact Fatigue, Load Cycle Reduction, Mounting, Bolts, Thermal, Dynamics, Advanced Gears)

6. Which of the following online trainings have you done through the manual?
   None, Basic, Wheel-End, Six Sigma, Flexibility, Standing Contact Fatigue, Load Cycle Reduction, Mounting, Bolts)

**General**

For each of the following statements select what best describes your impression to the manual today.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tr>
<td>1. I think that I would like to use this manual frequently.</td>
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<td>2. I found this manual unnecessarily complex.</td>
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<td>3. I think this manual is easy to use.</td>
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<td>5. I think that I would need assistance to be able to use this manual.</td>
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<td>5. I found the various functions in this manual were well integrated.</td>
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<td>6. I thought there was too much inconsistency in this manual.</td>
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<td>4. I would imagine that most users would learn to use it very quickly.</td>
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</table>
User manual

The user manual is a link where you can find a user guide, theory, examples and exercises which belong to the SKFbb software program. In this field we are discussing usability issues regarding the **user manual's appearance**.

1. Do you use the user manual?  
   (Yes, No) (If no go to question…)

2. How often do you use the user manual?  
   (Daily, Weekly, Monthly, Yearly, Never)

3. Is it easy to find information in the user manual?  
   (Yes, No) (If yes go to question…)

Why? (You can select more than one option)

- □ No synonyms
- □ Text too dense
- □ Paragraphs too long
- □ Not enough bullets
- □ Not enough tables
- □ Not enough graphics
- □ Not enough examples
- □ Not enough cross-references
- □ No indication about where you are in the manual
- □ Columns in table not labeled
- □ Poor choice of colors to highlight information
- □ Text in blue difficult to read
- □ Poor user interface

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

________________________________________

4. Is it easy to understand the content of the manual?  
   (Yes, No) (If yes go to question…)

Why? (You can select more than one option)

- □ Icons are described, but not shown
- □ Too much theoretical information
- □ Too much past tense/form
- □ Too much difficult terminology in the manual
- □ Not enough examples
5. Is it difficult to read the text in the user manual?  
(Yes, No) (If yes go to question…)

Why? (You can select more than one option)

☐ Text displayed in all upper case
☐ Acronyms not explained (example: EKS = Engineering Knowledge Services)
☐ Font too small
☐ Font difficult to read on screen

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

_____________________________________________

6. Do you find all information you need in the user manual?  
(Yes, No)

7. Does the user manual have a clear layout?  
(Yes, No)

8. Do you know how to move from the user manual to the theory part?  
(Yes, No)
9. Are the links in the manual well organized? (Yes, No)

10. Do you think that it’s confusing with a lot of links and information on one page? (Yes, No)

11. How long time approximately does it takes you to find something in the manual? (Less than 5 min, 30 min, 1 hour, 2-8 hours, more than 1 day)

12. Would you like to have access to an Acronym* dictionary in the user manual? (Yes, No)  *Acronym (example: EKS = Engineering Knowledge Services)

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

_____________________________________________

Reference manual

Next to the user manual, where you can find theory, there is also a reference manual where you can find (more) theory. See the link…

1. Did you know that there is a reference manual? (Yes, No) (If No go to question…)

2. Do you use it? (Yes, No) (If no go to question…)

3. How often do you use it? (Daily, Weekly, Monthly, Yearly, Never)

4. Is it easy to find information in the reference manual? (too easy, easy, normal, difficult, too difficult)

5. Do you find all information you need in the reference manual? (Yes, No)

6. Does the reference manual have a clear layout? (Yes, No)
7. Is it clear how to link back to the user manual?  
   (Yes, No)

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

--------------------------------------------

Theory
There are two different theory parts in the manual. One is more general and you can find it in the user manual and the other is a deeper theory which is in the reference manual.

In this field we are discussing the theory issues both in the user manual and in the reference manual.

1. Is it clear enough where to find a specific theory part in the user manual?  
   (Yes, No)

2. Is it clear enough where to find a specific theory part in the reference manual?  
   (Yes, No)

3. Does the user manual contain a lot of difficult terminology?  
   (Yes, No)

4. Does the reference manual contain a lot of difficult terminology?  
   (Yes, No)

5. Would you like to have access to an Acronym dictionary?  
   (Yes, No) Acronym (example: EKS = Engineering Knowledge Services)

6. Where do you often search when you are looking for a theory part?  
   (In the user manual, in the reference manual, both, neither)

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

--------------------------------------------

(6/9)
Training

Training is a link in which is placed in the user manual’s main menu. It contains several modules that you can have license for. In this field we are discussing issues that concern the training’s Quality.

1. Do you know where to find information about what kind of training do we have? 
   (Yes, No) (If No go to question…)

2. Does the information cover all the steps you need to begin a course?
   (Yes, No)

3. Is the level of the explanations concerning the content of the program good enough? 
   (Too easy, easy, normal, difficult, Too difficult)

4. Is the level of the theory part in the training good enough? 
   (too easy, easy, normal, difficult, too difficult)

5. Is the level of the examples in the training good enough? 
   (too easy, easy, normal, difficult, too difficult)

6. Is it good to have the training through the manual? 
   (Yes, No)

7. Are you missing any information in the training(s)? 
   (Yes, No)

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

_____________________________________________________________________

How To’s

The How To’s is a link which is placed in the user manual’s main menu. It helps the user to understand in a fast way how to use different functionalities in the program.
1. Have you ever used the How To’s?
   (Yes, No) (If no go to question…)

2. Was it easy to find what you were looking for?
   (too easy, easy, normal, difficult, too difficult)

3. Are the links well-organized?
   (Yes, No)

4. Are you missing any information in the How To’s?
   (Yes, No)

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

The Search Engine in the User Manual

The Search engine is placed under the user manual main menu. See link…

1. Do you know where the search engine in the manual is?
   (Yes, No) (If no go to question…)

2. Do you use it?
   (Yes, No)

3. How often do you use it?
   (Daily, Weekly, Monthly, Yearly, Never)

4. Is it easy to use?
   (too easy, easy, normal, difficult, too difficult)

5. Does it give you good alternatives/results of what you are looking for?
   (Yes, No)

You can give your feedback in the field bellow if you have additional remarks regarding the above questions.

FAQ

FAQ is a link in the user manual where you can find the (Frequently Asked Questions).
1. Do you know that there is an FAQ in the manual? 
   (Yes, No) (If No go to question…)

2. Do you use it? 
   (Yes, No)

3. Is the information useful? 
   (Yes, No)

4. Are you missing any information in FAQ? 
   (Yes, No)

You can give your feedback in the field below if you have additional remarks regarding the above questions.

_____________________________________________

CONCLUSIONS

Did the manual allow you to grasp the scope of the capabilities of the software? 

___Yes    ___No

   Comments would be appreciated:______________________________

Additional comments:___________________________________________

Thanks for participating
Appendix C
(1/18)

The Survey Results
Which SKFbb License/Licenses do the users have?

Which of the following online trainings have you done through the manual?
I think that I would need assistance to be able to use this manual.

I found various functions in this manual were well integrated.

I thought there was too much inconsistency in this manual.
I would imagine that most users would learn to use it very quickly.

Do you use the User Manual?

- Yes 46 (61%)
- No 29 (39%)

How often do you use the user manual?

- Monthly 21 (41%)
- Weekly 10 (20%)
- Yearly 15 (29%)
- Never 4 (8%)
- Daily 1 (2%)

Is it easy to find information in the user manual?

- Yes 20 (39%)
- No 31 (61%)
Do you find all the information you need in the User Manual?

- Yes: 15 (30%)
- No: 35 (70%)

Does the User Manual have a clear layout?

- Yes: 27 (56%)
- No: 21 (44%)

Do you know how to move from the user manual to the theory part?

- Yes: 25 (52%)
- No: 23 (48%)

Are the links in the manual well organized?

- Yes: 27 (57%)
- No: 20 (43%)

(8/18)
Do you think that it's confusing with a lot of links and information on one page?

- Yes: 17 (36%)
- No: 30 (64%)

Would you like to have access to an Acronym dictionary in the user manual?

- Yes: 34 (74%)
- No: 12 (26%)

How long time does it approximately take you to find something in the manual?

- Less than 5 min: 17 (38%)
- 30 min: 27 (56%)
- More than 1 day: 1 (2%)
- 2 - 8 hours: 0%
- 1 hour: 3 (6%)
Did you know that there is a reference manual?

- No: 38 (54%)
- Yes: 32 (46%)

Do you use the reference manual?

- No: 23 (51%)
- Yes: 22 (49%)

Do you find all the information you need in the reference manual?

- No: 22 (81%)
- Yes: 5 (19%)

Does the reference manual have a clear layout?

- No: 16 (59%)
- Yes: 11 (41%)
Is it clear enough where to find a specific theory part in the user manual?

- Yes: 26 (43%)
- No: 34 (57%)

Is it clear enough where to find a specific theory part in the reference manual?

- Yes: 24 (41%)
- No: 35 (59%)

Does the user manual contain a lot of difficult terminologies?

- Yes: 18 (31%)
- No: 41 (69%)

Does the reference manual contain a lot of difficult terminologies?

- Yes: 21 (36%)
- No: 37 (64%)
Is it good to have the training through the manual?

- No: 10 (16%)
- Yes: 51 (84%)

Are you missing any information in the training(s)?

- No: 28 (50%)
- Yes: 28 (50%)

Is the level of the explanations concerning the content of the program good enough?

Is the level of the theory part in the training good enough?
Is the level of the examples in the training good enough?

- Too Easy: 0
- 1: 0
- 2: 0
- 3: 39
- 4: 0
- 5: 0
- Too Difficult: 0

Have you ever used the How To's?
- Yes: 13 (20%)
- No: 53 (80%)

Are the links well-organized?
- No: 9 (45%)
- Yes: 11 (55%)

Are you missing any information in the How To's?
- No: 8 (42%)
- Yes: 11 (58%)
Is it easy to find what you are looking for in the How To's?

Do you know where the search engine is in the manual?

- Yes: 30 (44%)
- No: 38 (56%)

Do you use the Search engine?

- Yes: 25 (78%)
- No: 8 (24%)

Does it give you good alternatives/results of what you are looking for?

- Yes: 18 (60%)
- No: 12 (40%)