ABS CONSTRUCT USERS MANUAL
VERSION 1.2
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1. STARTING THE ABS CONSTRUCT PROGRAM

The Main Screen

When you first start the ABS CONSTRUCT program, you are presented with a graphics screen with several different items being displayed. First of all, along the top of the screen, is the menu bar. This is the area where all of the program functions are selected from. Try pointing the mouse (the arrow on the screen) over one of the words on that top line, and press a button on your mouse. What you should see is a list of menu selections 'drop down' below the text that you selected with the mouse. These items are also selectable by the mouse, and control the multiple functions of the ABS CONSTRUCT program.

Try, for example, this set of operations: Place the mouse over the 'FILES' selection and press a mouse button. You should see the FILES option menu drop down. Now move the mouse down to the 'Directory' option. You may hold the mouse button down (known as 'dragging' in software circles) or release the button before moving, whichever you are more comfortable with. Select the directory option by pressing and releasing the mouse button, and the menu will disappear. It will be replaced by a 'window' with options about the directory search on your disk. For now, place the mouse over the 'OK' button (the 'OK' text enclosed by a square is known as a button), and press the mouse button. A text screen will be displayed with the list of files in your current directory, and the mouse arrow will be replaced by a highlight bar. Moving the highlight bar to the bottom of the screen, you can make selections for 'MORE' or 'EXIT' by pressing and releasing the mouse button as before over the corresponding text. You will return to the graphics screen. The directory window will still be displayed, and will stay until another selection is made from the menu bar.

The second item of interest on the screen is the information bar. This bar, located at the bottom of the screen, tells you some important information about the data you are currently calculating. To the left, the filename of the data file is displayed. This allows you to easily determine which hull definition you are currently working on at any time. Next to the filename is the material descriptions. This area displays the current shell material being calculated for, and the shell material form being used. Next, to the right, is the area indicating the route of the report being used. If the report is being sent to a printer, the port name is displayed. If the report is being sent to a file, the filename of the report is displayed. When ABS CONSTRUCT is first loaded, this area is blank, but will be filled when the report session is started. To the far right is text indicating which mode of measure is being used, 'METRIC' or 'ENGLISH'. Further instructions in this document will describe how to change these values.

2. EDITING WITH MOUSE AND KEYBOARD

Editing input data values

ABS CONSTRUCT uses a very helpful input data editing scheme designed to allow quick changes to input data values. Any item on the screen that may be edited is selected by placing the mouse cursor over the numbers or text and pressing the left mouse button once. If the data can be changed by keyboard input, a highlight bar will appear. If the highlight bar does not appear, either the tip of the mouse cursor was not over the data value or the item may not be edited.

Changing one or more digits

When the highlight bar appears, the cursor will be placed in the far left end of the input space. The cursor may be moved by using the space bar, or the left/right arrow keys. Place the cursor under the single number to change and enter a new value. Press the ENTER key to make the change permanent.

Changing entire value

With the cursor at the far left position of the data input space, enter one or more new digits. As long as there is a space between the new values and the previous data value, the new value will completely replace the old value after pressing the ENTER key. It is important to remember that if there is no space between the new and old digits, ABS CONSTRUCT will accept ALL of the digits as the new value. To avoid this, enter a space after the last digit entered by pressing the space bar, and press the ENTER key.

Special Function Keys

Several keys have special functions when editing in an ABS CONSTRUCT window. All 'cursor' keys are functional. The left and right cursor keys move the input cursor in the current field being edited. The up and down cursor keys move through the selectable fields on the window in their respective directions. Home and end also perform their functions in the current field, moving the input cursor to the first or last position of the field.

Delete (Del) deletes from the current character in the field, while backspace (<-) deletes over the previous character in the field. The function key F1 deletes all text in the current field.

3. REPORTS

The OUTPUT Menu Item

ABS CONSTRUCT allows output to generated either in printed or disk ASCII file form that may be edited by a word processor. You may use the file based version to conserve paper and to generate professional looking reports for clients or for submittal to the ABS by editing them or adding text to them with a word processor.

Starting the Report Session

Under the main menu heading "Output", you will find the entry "Report". Selecting this entry will start the report session. A small window will appear asking you the route of the report generation. Reports can be routed to either disk or printer. Select the option by placing the mouse over the desired text and pressing the left mouse button.

Routing the report to the printer, you are asked to provide the port that your printer is connected to. If it is a parallel type printer, it will be connected to one of the "LPT" ports. If it is a serial (RS232) type printer, it will be on one of the "COM" ports. If you are not sure, the most common printer is parallel, "LPT1:", but you may need to experiment a bit to determine the correct port.

When starting the report session to the printer with formatting 'ON', please be sure to advance the paper to the top of a new page.

Routing the report to disk, you are asked to provide a name for the file to be generated. As in the case of loading and saving files, the filename may include the full DOS path, or just the filename. The later will be placed in the ABS directory for later use.

You may also choose to append your report file to an existing file. If the filename already exists in the directory, the system will prompt you to determine the action taken on the old file.

If you are using shorter or longer print media in your printer, you can change the value of the number of text lines per page for proper header and footer formatting. The standard number of lines per page on an 11" page is 66. The page number to start reporting at can also be manipulated, so extra information can be added to an already-completed report.

Turning the formatting off means no page numbers, headers, footers, or page jumps are generated.

Once the report system has been activated, any window that will generate a report will show an asterisk ("*") in the upper left hand corner. By selecting this asterisk with the mouse, the report for the current window is created and sent to the printer or disk.

Ending the Report Session

Under the main menu selection "Output", the selection "No Report" will stop the report generation session.

Report Creation
When the report session has been activated, the reporting system of ABS Construct works on a simple principle. The user (that's you) selects the report button (asterisk) in the upper left hand corner of the active window. The system determines which report outline file belongs with the current window, and reads it line by line. As each line is read, ABS Construct replaces any "variable" reference fields with the

most recently calculated values. The line is then written to the printer or disk, whichever the report has been routed to.

The report outline files that you received with the ABS Construct software are set up to provide a close duplication of screen data to the printer or disk. PLEASE feel free to edit them, change their format, add variable references, printer codes, etc.. BUT BY ALL MEANS - keep a copy of the original report outline files!

Editing Report Outlines

Appendix A defines each of the report outline files included with the ABS Construct software. These files can be recognized by the filename format of "(NNA).ACR". The first "N" defines the main menu selection, and the second "N" defines the sub-menu selection. The "A" is used to identify the report when several report files are used in the same menu selection. For example, the material selection, Fiberglass, has a main menu number 2 and a sub-menu number 1. This selection has three screens of information, and each has a report outline associated with it.

The report generated by the first screen is produced using the outline file "(21A).ACR", the second screen using "(21B).ACR", and the third using "(21C).ACR". Amazingly simple, isn't it?
To identify a variable field in a report file, you only have to know three things. First, the identifier of the varible you are displaying on the report. This can be found in Appendix A. Second, the width in characters of the information you wish to see in the report. Third, the number of places to carry the decimal representaion if the data being displayed is a Real (decimal) number. Please note that the standard values for the second and third items are included with the variable identifier list in Appendix A.

The reference to the variable is created in the report text itself by enclosing the above information in curly brackets ("{" and "}"). For example, to place the value of the hull breadth in one of the reports, for 10 characters, with 3 decimal places showing, your field definition would look like the following:

        {H3:10:3}

But hold on! That looks right, but now there is no way to identify the value on the report. All you will see is a number on the paper. Place some identifying text around it, and always try to incorporate units when applicable. If the hull breadth is 10.2365 feet, and the report line looks like this

        Hull Breadth = {H3:10:3} {U6:6}

the report generated would have the following text:

        Hull Breadth =   10.236 Ft.

Note that the unit field ("{U6:6}") only contains the length of the data in characters. For text and integer (whole) numbers, the decimal length can be omitted, otherwise it will be ignored by the report system.

A couple of hints on reports: If you do edit the report files with a word processor, please save the files in a "Non-Formatted" or "ASCII" mode. Most word processors, the good ones anyways, have this mode available. If this is not done, unpredictable results will occur when the report outline is sent to the printer. This happens because word processors place hidden characters in the text for formatting purposes. These characters can cause your printer to write strange text and/or graphics, ruining your report.

Hidden printer control sequences can be placed in the body of a report outline. This can be handy for underlining, bold print, italics, even graphics. ABS Construct will not strip these characters from the report outline. Consult your printer manual for further details on this matter.

The report system also includes a special file named "(HEADER).ACR". It contains the header and footer text to be placed on the formatted report. The value on the first line of the file is the number of lines in the header area. The maximum number of lines in the header is 10. The second line contains the number of lines in the footer area. The maximum number of lines in the footer is 5. The following lines contain the header and footer text, and should match the count given in the first two lines. Please, by all means, edit this file to include any pertinent information about your company.

4. FILE OPTIONS

HULL DATA

When ABS CONSTRUCT begins, it automatically loads a file called DEFAULT ABS. This file contains hull dimensions and other data that the user input the last time you used ABS CONSTRUCT. If you do not select the HULL DATA item, calculations will be done based on hull dimensional data supplied in the DEFAULT.ABS file.

Other HULL DATA files can be opened by selecting the LOAD ABS DATA menu item. The user should assign a new file name for each hull design he chooses to analyze. To easily create hull data for a sistership, select the file of the original hull, using the LOAD ABS DATA menu item, modify the values, and save it with a new name using the SAVE ABS DATA menu item. The original hull data will not be changed. A list of available hull data files can be viewed by selecting the DIRECTORY menu item.

View/Modify the hull data:

Hull data may be modified and viewed at any time by first selecting the HULL DATA menu item. ABS CONSTRUCT will display a list of hull dimensions which may be modified by placing the mouse over an item and clicking the left mouse button once. A highlight bar will appear over the value and the cursor placed at the left-most edge of the value. A new value may be entered using the editing methods described above. Pressing "ENTER" will accept the new value. Now when you select a calculation function such as PLATING, KEEL, etc., the new hull dimensions will be used.

At the top of the HULL data list are three lines of text that are intended to hold short notes about the hull design. This data is for your future reference containing serial numbers or general descriptions, and is not used in any calculations.

KEEL DATA

When ABS CONSTRUCT begins, it loads a file called DEFAULT.ABS, it contains keel dimensional data for the last hull/keel analyzed by ABS CONSTRUCT. The user may select keel data from other hull files by selecting the LOAD ABS DATA menu item, perhaps after looking through available files using the DIRECTORY menu item.
When this menu item is selected ABS CONSTRUCT displays the current keel data on the screen. Any of the keel dimensions may be changed by using the data editing methods described above.

These changed values will be saved in the original file when the SAVE ABS DATA menu item is selected. When the values have been changed or reviewed, you may continue making calculations by selecting KEEL, PLATING, etc., from the main menu list. The calculations and reports that follow will use the newly-entered keel data.

LOAD ABS DATA

When this menu item is selected, a small window will open and present the name of the last ABS data file to be loaded by ABS CONSTRUCT. You may accept this file name by placing the mouse over the OK button and pressing the left mouse button once. You may enter a new file name by placing the mouse cursor over the file name a pressing the left mouse button once. The file name will be highlighted, and may be edited as described above. The new file can then be loaded by selecting the OK button with the mouse.

RAPID FILE SELECT

You may review all of the available input data files, and select the desired one with a mouse, by replacing the suggested file with a filename containing a DOS 'wildcard' character. If the filename contains a '*' character or a '?' character, ABS CONSTRUCT will display all of the files in the current directory that match the wildcard name. When this is complete, a highlight bar will be displayed, and will move over the file names as the mouse is moved. Place the highlight over the desired file name and press the left mouse button once. The ABS data in the file will be read. Calculations and reports generated after this will be based upon the data from the new file.

LOAD PROLINES DATA

This function will be added in the future, and is not available at this time.

SAVE ABS DATA

When the user quits ABS CONSTRUCT, the program will automatically save all of the last input data values in a file called DEFAULT.ABS. The user is encouraged to save data from each hull design in a new file by using this menu item (SAVE ABS DATA).
When this item is selected, a small window will open and suggest a file name to save the input data under. To accept this file name, place the mouse cursor over the OK button and press the left button once. To create a sistership file, or a new data file, place the mouse cursor over the file name and press the left button once. Now edit the file name as described above. To accept this new file name, select the OK button with the mouse.

We STRONGLY suggest that you use a common filename extension, such as '.ABS' for all of your ABS data file names. This will make the files easier to find when using the DIRECTORY menu item, and will be easier to identify. Try not to use extensions such as '.EXE', '.COM', '.SYS', '.ACR', or '.AHL'. These mean special things to your DOS system and ABS CONSTRUCT.

If the file name you have chosen is already on disk ABS CONSTRUCT will warn you and ask if it is ok to erase the old file and write the new one over it. Select your response by clicking either the YES or NO button with the mouse.

USE THIS FUNCTION OFTEN TO AVOID INPUT DATA LOSS DUE TO POWER FAILURE OR PROGRAM CRASH. We don't plan on ABS CONSTRUCT crashing but YOU may be clever enough to find a way!

DIRECTORY

You may use this menu item to display any set of files in any directory on your PC. When you select this item, a small window will appear with a suggested disk directory, and the file mask "*.*". If you select the

OK button with the mouse, every file in the directory will be listed. If you choose to alter the directory path or the filename mask, do so by selecting the desired field with the mouse and editing as described above.

SETUP

This menu item allows the user to choose either metric or english units of measure, date, and turn on or off the "click" sound effects.

DATE

This item may be edited by using the editing methods described above. The day of the week will automatically change to match the input date and may not be edited.

UNITS

Select either english or metric units by simply clicking the left mouse button when the mouse cursor is over this item. The opposite units to those currently displayed will appear.
It is important that we cover a peculiarity of the ABS CONSTRUCT software at this point. Because the ABS Guide itself gives no proper method of translating from english rule to metric and back, ABS CONSTRUCT does not translate input or calculated data between these two forms. Because of this, anytime that units are switched, all data must be re-entered using the new units. This includes the selection of material data. We trust that you will do most of your work in either english or metric, and will never be faced with this task.

SOUND

Turn the sound effects on or off by clicking the left mouse button when the cursor is over the ON/OFF button.

QUIT

When this item is chosen, ABS saves the last data input values into the file DEFAULT.ABS, and returns the user to DOS. When the program is next used, these input data values will be read back into ABS CONSTRUCT. They can be replaced by selecting the LOAD ABS DATA menu item as described above.

5. MATERIAL SELECTION

General information on material

The construction material currently being used to make calculations is shown in the bar along the screen bottom along with the current data file and the units of measure.
ABS CONSTRUCT contains a complete list of all of the material strength characteristics found in the American Bureau of Shipping Scantling Rules for Offshore Racing Yachts handbook. Material strengths for Fiberglass core materials, aluminum sheet and stock, wood species, and steel sheet are found in data files ending in .dat on your original program disks. These files are in ASCII or text that can be read by any word processor.
You may add material strength values to these lists as follows:
 1) MAKE A BACKUP COPY OF THE ORIGINAL DATA FILES FIRST!
 2) Read the data file to be altered into a word processor in ASCII or NON DOCUMENT MODE, or FORMAT OFF mode
 3) Add additional strength information in EXACTLY the same format and column position.
 4) Save the file and copy it into the same directory as ABS CONSTRUCT.

5) You now have access to the new material values within ABS CONSTRUCT.

FIBERGLASS

When choosing Fiberglass as a construction material, ABS CONSTRUCT will prompt you to select either sandwich (innner and outer skins with a core material such as balsa wood) or single laminate construction by opening a window with two "buttons". Click the left mouse button on the construction method of your choice.

If you choose "sandwich" construction, ABS CONSTRUCT will pop up a list of core materials and their strengths. Move the mouse cursor up or down over this list and select one by pressing the left mouse button once. The core material strength values will be shown in a window which will allow you to edit those material strength values by simply clicking the left mouse button on the number to be changed and editing as described above. When editing is complete click the OK button on the screen.

Next you will be prompted to choose either multidirectional or single directional laminate. The most common method is multidirectional with layers of glass cloth placed at 45 or 90 degree angles to one another. Single directional layers typically use high strength materials such as carbon fiber.
You will now be shown a list of material strengths that correspond to the general fiberglass characteristics listed in the ABS handbook. You may change any of these values by clicking the left mouse button on the numbers themselves, and editing them as described above.

Once you have chosen FIBERGLASS as a material and edited the strength values you may select any entry from the PLATING menu to calculate hull thickness requirements anywhere on the hull.

WOOD

ABS CONSTRUCT allows the choice of several wood species and construction methods in wood. When WOOD is chosen as a material, ABS CONSTRUCT will pop up a list of wood species and material strengths. Move the highlight bar over the desired wood species by moving the mouse. Click the left button once over the material you desire.

Please note that not all wood species have all material strengths docmented. We have entered only those values stated in the ABS handbook. You may input these values by editing the wood data file as described above.

After making your wood species selection, you will be shown a wood data window. You may select among Carvel, Plywood, or or Cold Molded construction methods by clicking the left mouse button one or more times over the construction method button. After verifying the wood data and construction method you may select from the PLATING or INTERNALS menus to make calculations.
You may switch among many wood species to compare required scantling thicknesses by reselecting the MATERIAL menu.

ALUMINUM

If you select this material for construction, ABS CONSTRUCT will pop up a window lsiting several standard grades of aluminum materials. You may select one by moving the mouse until the highlight bar is over the desired material. Click the left mouse button once and the characteristics of this aluminum alloy will be read in.

A window containing the aluminum strengths will be displayed on screen. You may now select the PLATING or INTERNALS calculations by selecting from those menus.

STEEL

If you select this material for construction, ABS CONSTRUCT will pop up a window listing several standard grades of steel material. You may select one by moving the mouse until the highlight bar is over the desired material. Click the left mouse button once and the characteristics of this steel alloy will be read in.

A window containing the steel strengths will be displayed on screen. You may now select the PLATING or INTERNALS calculations by selecting from those menus.

6. PLATING CALCULATIONS

SHELL

Choosing this menu item causes ABS CONSTRUCT to calculate the thickness and strengths of the shell at a default hull location, using the currently selected material and strengths, and the HULL dimensions found in the HULL DATA file. You may alter the current hull location, and spacings of reinforcements by editing these values as described above.

IN WAY OF KEEL

Choosing this menu item causes ABS CONSTRUCT to calculate the thickness and strengths of the shell at a default hull location, using the currently selected material and strengths, and the HULL and KEEL dimensions found in the HULL DATA file and the KEEL DATA file. It is assumed that the locations being calculated for are in the reinforced shell area for the keel. You may alter the current hull location, and spacings of reinforcements by editing these values as described above.

DECK

Choosing this menu item causes ABS CONSTRUCT to calculate the thickness and strengths of the deck plating at a default hull location, using the currently selected material and strengths, and the HULL dimensions found in the HULL DATA file. You may alter the current DECK location, and spacings of reinforcements by editing these values as described above.

CABIN

Choosing this menu item causes ABS CONSTRUCT to calculate the thickness and strengths of the cabin house top, sides, and end plating at a default hull location, using the currently selected material and strengths, and the HULL dimensions found in the HULL DATA file. You may alter the current CABIN location, and spacings of reinforcements by editing these values as described above.

BULKHEAD

Choosing this menu item causes ABS CONSTRUCT to calculate the thickness and strengths of the bulkhead plating at a default hull location, using the currently selected material and strengths, and the HULL dimensions found in the HULL DATA file. You may alter the current BULKHEAD location, and spacings of reinforcements by editing these values as described above.

TANKS

Choosing this menu item causes ABS CONSTRUCT to calculate the thickness and strengths of the shell at a default hull location, using the currently selected material and strengths, and the HULL dimensions found in the HULL DATA file. You may alter the current TANK location, and spacings of reinforcements by editing these values as described above.

7. INTERNALS CALULATIONS

TRANSVERSE

Choosing this menu option allows the calculation of transverse (athwartships) internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.
When this selection is chosen you will be prompted to select either DECK or SHELL refinforcements. Make your choice by clicking the appropriate button in the prompt window with the mouse. You may select the opposite choice by simply reselecting the INTERNALS menu.

After choosing either DECK or SHELL, you will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

LONGITUDINAL

Choosing this menu option allows the calculation of Longitudinal (fore and aft) internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.

When this selection is chosen you will be prompted to select either DECK or SHELL refinforcements. Make your choice by clicking the appropriate button in the prompt window with the mouse. You may select the opposite choice by simply reselecting the INTERNALS menu.

After choosing either DECK or SHELL, you will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

GIRDER

Choosing this menu option allows the calculation of internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.

When this selection is chosen you will be prompted to select either DECK or SHELL refinforcements. Make your choice by clicking the appropriate button in the prompt window with the mouse. You may select the opposite choice by simply reselecting the INTERNALS menu.

After choosing either DECK or SHELL, you will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

STRINGER

Choosing this menu option allows the calculation of longitudinal (fore and aft) internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.
When this selection is chosen you will be prompted to select either DECK or SHELL refinforcements. Make your choice by clicking the appropriate button in the prompt window with the mouse. You may select the opposite choice by simply reselecting the INTERNALS menu.

After choosing either DECK or SHELL, you will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

BEAMS

Choosing this menu option allows the calculation of internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.

When this selection is chosen you will be prompted to select either DECK or SHELL reinforcements. Make your choice by clicking the appropriate button in the prompt window with the mouse. You may select the opposite choice by simply reselecting the INTERNALS menu.

After choosing either DECK or SHELL, you will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

BULKHEAD

Choosing this menu option allows the calculation of transverse (athwartships) internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.

When this selection is chosen you will be prompted to select either STRUCTURAL or TANK reinforcements. Make your choice by clicking the appropriate button in the prompt window with the mouse. You may select the opposite choice by simply reselecting the INTERNALS menu.

After choosing either STRUCTURAL or TANK, you will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

FLOORS

Choosing this menu option allows the calculation of transverse (athwartships) internal reinforcements. This calculation requires the dimensions of the structural member itself and the local thickness of the plating material it attaches to.
You will see a set of calculations based upon default dimensions, or the last entered dimensions of the internal member. You may change or view these dimensions by clicking the mouse on the CALC button in the lower right corner of the screen. This will present a graphics screen showing the locations and dimesions of the internal member used to make the previous calculations. You will also find the thickness of the shell as an input. Any of these dimesions and input values may be changed by simply clicking the mouse cursor over the actual numbers to be changed. The value will be highlighted if it is a valid user input. Now edit the values as described above.

8. RUDDER CALCULATIONS

STOCK

Choosing to make rudder stock (shaft) calculations will cause ABS construct to prompt you to select either solid or tubular shaft material in a small data window. Make your selection by clicking the YES or NO button with the mouse. You will now see a calculation window that is based on the last dimensions of the rudder that were entered. You may edit any of the input data in this calculation window by clicking the mouse on any number that is a valid input, and editing as described above.

Changing RUDDER Dimensions

You may view or edit the current rudder dimensions by clicking the DIMENSIONS button in the upper right corner of the calculation window. ABS CONSTRUCT will then display a graphic drawing of a typical rudder with the definitions of each dimesion displayed. You may edit any input value by clicking on the number with the mouse and editing it as described above.

Returning to the Calculation window

You may now view the results of any dimesional changes by clicking the CALC button in the upper right hand corner of the window. You will be returned to the original window and the output values will be recalculated with the new rudder dimension data.

BEARINGS

When this menu item is selected you will see a calculation window with default or last entered values displayed. You will also see a material button displayed with either STEEL, BRONZE or SYNTHETIC as the bearing material. You may choose among these materials by clicking the mouse button on the material button one or more times until the desired material appears in the window. As each material is chosen the calculations will be updated on screen.

BOLTS

When this menu item is selected you will see a calculation window appear. The calculations use either default or the last entered values to make these calculations. You may edit any of the input data, including the bolt material strength characteristics by clicking the mouse on the number to be changed and editing it as described above.

HORN

This menu item pertains only to semi spade rudders and is particularly complex. It is not implemented at this time.

SEMI-SPADE/SPADE

This portion of the menu determines which type of rudder is used in the calculations. Only the SPADE rudder is implemented at this time.

9. KEEL CALCULATIONS

BOLTS

Choosing this menu item displays a calculation window that uses either default or last entered values of the keel dimensions conatined in KEEL DATA (See FILE menu and KEEL DATA menu item). You may edit any input value in this calculation window by following the directions given above.

An important note here: the keel weight is copied from the master keel weigh value found in the keel definition, under FILES. Changing this value will not effect the overall definition of the keel, which allows you to experiment with this value and its effect on the keel bolt diameter.

Summing the keel bolt distances

You may calculate the sum of the keel bolt distances from centerline by clicking the SUM PANEL button in the bottom center of the calculation window. A window to the right of the main calculation window will open and will allow the entry of up to 40 keel bolt locations (distance from keel centerline). You may enter values at any position and edit them in any order by clicking on the numbers with the mouse cursor. You may also use the arrow keys, and the ENTER key to move around. Each time a value is entered (press ENTER after all digits are in place) the required keel bolt diameter will be recalculated in the main calculation window to the left. You may erase the SUM PANEL by clicking on the OK button in the upper right hand corner of the SUM PANEL.

SHELL

When this menu item is selected, a calculation window will appear and show the plating thickness required to cover a keel with internal ballast. (Fiberglass shell etc) You may change any of the input data values by clicking on them with the mouse and editing them as described above, or selecting the KEEL DATA item from the FILE menu list and changing the basic keel dimensions.
10. HELP FILES

Under the main menu selection HELP, you will find a list of subjects with help files available. Selecting one of these subjects will display the associated text file. These files are listed in Appendix B. These files contain much of the information found in this manual.

If you have any information you may want to add to these files, feel free to do so. There are some important points to keep in mind when you are editing these files. First of all, remember to always save the files in a NON-FORMATTED mode, meaning there are no word processor formatting characters imbedded in the text. Secondly, never allow a line to be longer than 79 characters, which would cause the text to 'wrap around' the screen and disrupt the help file display.

A. APPENDIX A

This section contains information regarding the report files and the report variables.

Report Files

The following is a list of the report files that are included with the ABS CONSTRUCT package. Please refer to the report section of this manual for an explanation of their use.

Files
(11A).ACR   Hull data
(12A).ACR   Keel data

Material
(21A).ACR   Fiberglass sandwich core data
(21B).ACR   Minimum properties of sandwich laminate
(21C).ACR   Minimum properties of single skin laminate
(22A).ACR   Wood selection data
(23A).ACR   Aluminum selection data
(24A).ACR   Steel selection data

Plating
(31A).ACR   Shell plating, non fiberglass sandwich
(31B).ACR   Shell plating, fiberglass sandwich
(32A).ACR   Shell plating in way of keel, non fiberglass sandwich
(32B).ACR   Shell plating in way of keel, fiberglass sandwich
(33A).ACR   Deck plating, non fiberglass sandwich
(33B).ACR   Deck plating, fiberglass sandwich
(34A).ACR   Cabin plating, non fiberglass sandwich
(34B).ACR   Cabin plating, fiberglass sandwich
(35A).ACR   Bulkhead plating, non fiberglass sandwich
(35B).ACR   Bulkhead plating, fiberglass sandwich
(36A).ACR   Tank plating, non fiberglass sandwich
(36B).ACR   Tank plating, fiberglass sandwich

Internals
(41A).ACR   Deck transverse, non fiberglass
(41B).ACR   Shell transverse, non fiberglass
(41C).ACR   Deck transverse, fiberglass
(41D).ACR   Shell transverse, fiberglass
(42A).ACR   Deck longitudinal, non fiberglass
(42B).ACR   Shell longitudinal, non fiberglass
(42C).ACR   Deck longitudinal, fiberglass
(42D).ACR   Shell longitudinal, fiberglass
(43A).ACR   Deck girder, non fiberglass
(43B).ACR   Shell girder, non fiberglass
(43C).ACR   Deck girder, fiberglass
(43D).ACR   Shell girder, fiberglass
(44A).ACR   Deck stringer, non fiberglass
(44B).ACR   Shell stringer, non fiberglass
(44C).ACR   Deck stringer, fiberglass
(44D).ACR   Shell stringer, fiberglass
(45A).ACR   Deck beam, non fiberglass

(45B).ACR   Shell beam, non fiberglass
(45C).ACR   Deck beam, fiberglass
(45D).ACR   Shell beam, fiberglass
(46A).ACR   Bulkhead, non fiberglass
(46B).ACR   Bulkhead, fiberglass
(46C).ACR   Tank, non fiberglass
(46D).ACR   Tank, fiberglass
(47A).ACR   Floor, non fiberglass
(47B).ACR   Floor, fiberglass
(4AA).ACR   Effective width of plating, non fiberglass
(4AB).ACR   Effective width of plating, fiberglass

Rudder
(51A).ACR   Stock diameter, spade rudder, solid stock
(51B).ACR   Stock diameter, spade rudder, tubular stock
(52A).ACR   Rudder bearings
(53A).ACR   Rudder bolts
(5AA).ACR   Spade rudder dimensions

Keel
(61A).ACR   Keel bolts
(61B).ACR   Sum of transverse distances, keel bolts
(62A).ACR   Keel shell

Headers and Footers
(HEADER).ACR   Report header and footer description

Report Variables
This section describes the variable fields that are available for use in generating reports from ABS
Construct.
Units:
Text to place in reports as unit descriptors. If english units are being used, the first value indicated will be
returned, otherwise the second value is returned for metric units.

ID	SIZE	DESCRIPTION
U1	6	English = 'TRUE', metric = 'FALSE'
U2	6	'Lbs' / 'Kg'
U3	6	'In.' / 'mm'
U4	6	'Psi' / 'Ksmm'
U5	6	'English' / 'Metric'
U6	6	'Ft' / 'm'
U7	6	'Lb/ft3' / 'Kg/m3'
U8	6	'In' / 'cm'
U9	6	'Tons' / 'Mtons'
U10	6	'Psi' / 'Kg/cm2'

Report Variables:
Please note that the letter 'O' is used as the first letter in the ID of these variables, not the number '0'.

ID	SIZE	DESCRIPTION
O1	3	Report page number
O2	3	Number of lines per page
O3	3	Printer number
O4	25	Output report file name
O5	6	Format = 'TRUE', no format = 'FALSE'

Date:

ID	SIZE	DESCRIPTION
D1	4	Year
D2	2	Month
D3	2	Day
D4	12	Day of week

Hull Data:

ID	SIZE	UNIT	DESCRIPTION
N1	25		ABS data filename
N2	40		Current directory
N3	40		General description line 1
N4	40		General description line 2
N5	40		General description line 3
H1	10:4	m/ft	Hull length overall
H2	10:4	m/ft	Hull length at waterline
H3	10:4	m/ft	Hull breadth
H4	10:4	m/ft	Depth of canoe hull
H5	10:4	m/ft	Draft from waterline to bottom of canoe hull
H6	10:4	m/ft	Scantling length
H7	6		Class '0' hull = 'TRUE', else 'FALSE'
H8	10:4	m/ft	Distance from LOA to LWL

Keel Data:

ID	SIZE	UNIT	DESCRIPTION
K1	10:4	m/ft	Keel depth below hull
K2	10:4	m/ft	Root chord length of keel
K3	10:4	kg/lbs	Keel weight
K4	10:4	m/ft	Distance from hull to keel center of gravity
K5	10:4	m/ft	Distance from start of LWL to keel
K6	10:4		Percent of keel depth for reinforced shell

Material Selection:

ID	SIZE	DESCRIPTION
M1	3	Material selection number
M2	40	Material subtype description
M3	40	Material type description

Fiberglass Data:

ID	SIZE	UNIT	DESCRIPTION
F1	12		Laminate form description
F2	6		Multi directional laminate = 'TRUE'
F3	10:4	Ksmm/psi	Actual flexural strength
F4	10:4	Ksmm/psi	Actual flexural modulus
F5	10:4	Ksmm/psi	Actual tensile strength (outside skin)
F6	10:4	Ksmm/psi	Actual tensile modulus (inside skin)
F7	10:4	Ksmm/psi	Actual compressive strength (inside skin)
F8	10:4	Ksmm/psi	Actual compressive modulus (outside skin)
F9	10:4	Ksmm/psi	Actual shear strength perpendicular to warp
F10	10:4	Ksmm/psi	Actual shear strength parallel to warp
F11	10:4	Ksmm/psi	Actual shear modulus parallel to warp
F12	10:4	Ksmm/psi	Actual interlaminar shear strength
F13	10:4	Ksmm/psi	Min. flexural strength
F14	10:4	Ksmm/psi	Min. flexural modulus
F15	10:4	Ksmm/psi	Min. tensile strength (outside skin)
F16	10:4	Ksmm/psi	Min. tensile modulus (inside skin)
F17	10:4	Ksmm/psi	Min. compressive strength (inside skin)
F18	10:4	Ksmm/psi	Min. compressive modulus (outside skin)
F19	10:4	Ksmm/psi	Min. shear strength perpendicular to warp
F20	10:4	Ksmm/psi	Min. shear strength parallel to warp
F21	10:4	Ksmm/psi	Min. shear modulus parallel to warp
F22	10:4	Ksmm/psi	Min. interlaminar shear strength
F23	40		Laminate core description
F24	10:4	Km3/Lf3	Core density
F25	10:4	Ksmm/psi	Core minimum ultimate shear strength
F26	10:4	mm/in	Core thickness
F27	10:4	mm/in	Laminate outside skin thickness
F28	10:4	mm/in	Laminate inside skin thickness
F29	10:4	cm3/in3	Section modulus of outside skin
F30	10:4	cm3/in3	Minimum section modulus of outside skin
F31	10:4	cm3/in3	Section modulus of inside skin
F32	10:4	cm3/in3	Minimum section modulus of inside skin
F33	10:4	cm4/in4	Moment of inertia of laminate
F34	10:4	cm4/in4	Minimum moment of inertia of laminate
F35	10:4	mm/in	Average of core and overall thickness
F36	10:4	mm/in	Min. average of core and overall thickness
F50	10:4	mm2/in2	Area of inside skin of modulus section
F51	10:4	mm2/in2	Area of outside skin of modulus section
F52	10:4	mm2/in2	Area of core of modulus section
F53	10:4	mm2/in2	Area of modulus section
F54	10:4	mm/in	Axis of inertia, modulus section
F55	10:4	cm4/in4	Moment of inertia, inside skin
F56	10:4	cm4/in4	Moment of inertia, outside skin
F57	10:4	cm4/in4	Moment of inertia, core section
F58	10:4	mm/in	Distance to axis, inside section
F59	10:4	mm/in	Distance to axis, outside section
F60	10:4	mm/in	Distance to axis, core section

Wood Data:

ID	SIZE	UNIT	DESCRIPTION
W1	3		Wood form number
W2	12		Wood form description
W3	40		Wood name
W4	7:2		Specific gravity of wood
W5	10:4	Ksmm/psi	Bending modulus of rupture
W6	10:4	Ksmm/psi	Bending modulus of elasticity
W7	10:4	Ksmm/psi	Tensile strength perpendicular to grain
W8	10:4	Ksmm/psi	Compressing strength parallel to grain

Aluminum Data:

ID	SIZE	UNIT	DESCRIPTION
A1	40		Aluminum alloy name
A2	40		Aluminum stock description
A3	10:4	Ksmm/psi	Minimum ultimate tensile strength, welded
A4	10:4	Ksmm/psi	Minimum yield strength, unwelded
A5	10:4	Ksmm/psi	Minimum yield strength, welded

Steel Data:

ID	SIZE	UNIT	DESCRIPTION
S1	40		Steel grade description
S2	10:4	Ksmm/psi	Minimum ultimate tensile strength
S3	10:4	Ksmm/psi	Minimum yield strength

Plating Data:

ID	SIZE	UNIT	DESCRIPTION
P1	4		Plating selection number
P2	10:4	mm/in	Minimum thickness of plating
P4	10:4	mm/in	Spacing between support members
P5	10:4	mm/in	Chord length along support member
P6	10:4	m/ft	Design head from table 7.1, ABS manual
P7	10:4		Design reduction factor, tables 7.4, 7.5
P8	10:4		Plate panel aspect coefficient
P9	10:4	Ksmm/psi	Design stress
P0	10:4		Correction factor for curved plating
P11	10:4	mm/in	Max chord height between support members
P12	10:4	m/ft	Distance bulkhead to deck at centerline
P13	10:4	m/ft	Distance to top of tank overflow
P14	10:4	m/ft	Position aft of forward end of LOA
P15	10:4	m/ft	Position above lowest point of canoe hull
P16	10:4		Plate panel aspect coefficient, FRP panel
P17	10:4	Ksmm/psi	Laminate design stress
P18	10:4		Laminate design head reduction factor
P19	10:4		Laminate plate panel aspect ratio

Internals Data:

ID	SIZE	UNIT	DESCRIPTION
I2	10:4	m/ft	Position above lowest point of canoe hull
I3	10:4	m/ft	Position aft of foreward end of LOA
I4	10:4	m/ft	Girth distance from position to centerline
I5	10:4	m/ft	Girth distance from gunwale to centerline
I6	10:4	m/ft	Spacing of internal
I7	10:4	m/ft	Distance between support points
I8	4		Number of floors in way of keel
I9	10:4	m/ft	Bulkhead distance to deck or tank overflow
I10	10:4	cm3/in3	Minimum section modulus clear of keel
I11	10:4	cm3/in3	Minimum section modulus in way of keel
I12	10:4	cm3/in3	Floors section modulus clear of keel
I13	10:4	cm3/in3	Floors section modulus in way of keel
I14	10:4	cm4/in4	Minimum moment of inertia clear of keel
I15	10:4	cm4/in4	Minimum moment of inertia in way of keel
I16	10:4	cm4/in4	floors moment of inertia clear of keel
I17	10:4	cm4/in4	floors moment of inertia in way of keel
I18	10:4	mm/in	Effective width of plating
I19	10:4		Variable 'C', section 8.1.3 of ABS manual
I20	10:4		Same as above, for floors at centerline
I21	10:4		Design head from table 8.1a of ABS manual
I22	10:4	Ksmm/psi	Design stress from table 8.2 of ABS manual
I23	10:4		Centerline reduction 'N', section 8.1.3
I24	10:4	cm3/in3	Increase in section modulus in way of keel
I25	10:4		Inertia 'Ci', section 8.1.3
I26	10:4	Ksmm/psi	Modulus of elasticity
I27	10:4		Floor inertia 'Ci', section 8.1.3
I28	10:4	mm/in	Effective width of plating at opening
I29	10:4	mm/in	Stiffener flange thickness
I30	10:4	mm/in	Stiffener side thickness
I31	10:4	mm/in	Stiffener crown width
I32	10:4	mm/in	Stiffener base width
I33	10:4	mm/in	Stiffener height
I34	10:4	mm/in	Stiffener flange width

Rudder Data:

ID	SIZE	UNIT	DESCRIPTION
R1	10:4		Stock minimum ultimate tensile strength
R2	10:4		Stock minimum ultimate yield strength
R3	10:4		Lift coefficient of rudder
R4	10:4		Estimated hull displacement
R5	10:4		Min. stock diameter at neck bearing
R6	10:4		Min. stock diameter at carrier bearing
R7	10:4		Min. stock diameter at rudder bottom
R9	10:4		Tubular stock outside diameter
R10	10:4		Tubular stock inside diameter
R11	10:4		Tube stock corresponding solid diameter
R12	6		'TRUE' = tubular stock, else 'FALSE'
R13	6		Stock material form
R14	10:4		Bending moment at neck bearing
R15	10:4		Torque at neck bearing

R16 10:4   Total force on rudder
R17 7:3   Upper rudder length (Lu)
R18 7:3   Mid rudder length (L)
R19 7:3   Length centerline to center of area (Lc)
R20 7:3   Bottom rudder length (Ll)
R21 7:3   Length leading edge to centerline (Xl)
R22 7:3   Height of rudder (H)
R23 7:3   Height between bearings (Ha)
R24 7:3   Height neck bearing to rudder bottom (Hb)
R25 7:3   Width of bearing (W)
R26 7:3   Projected area of rudder
R27 10:4   Diameter of stock in bearing
R28 10:4   Rudder bearing length
R29 10:4   Max allowable pressure at neck bearing
R30 10:4   Max allowable pressure at carrier bearing
R31 12   Rudder bearing type description
R32 10:4   Minimum rudder bolt diameter
R33 10:4   Min. ult. tensile str. of bolt material
R34 10:4   Min. Yield strength of bolt material
R35 10:4   Pitch circle radius of coupling bolts
R36 3   Number of rudder coupling bolts

Keel Bolts:
ID   SIZE   UNIT   DESCRIPTION
B1   10:4   mm/in   Keel bolt minimum diameter
B2   10:4   kg/lbs   Keel weight for keel bolt use
B3   10:4   mm/in   vertical distance from center of gravity
B4   10:4   Ksmm/psi minimum yield strength of bolt material
B5   10:4   mm/in   Summation of bolt distances
B6-
B45 10:4   mm/in   Bolt distances

Keel Shell:
ID   SIZE   UNIT   DESCRIPTION
C1   10:4   mm/in Keel plating width along chord
C2   10:4   mm/in Keel plating length along chord
C3   10:4   mm/in Minimum distance chord to plating
C4   10:4   Correction factor for curve of plating
C5   10:4   mm/in Minimum keel plating thickness

B. APPENDIX B

This appendix describes the help files that are included in the ABS CONSTRUCT package. Please consult the section on help files in this manual for further information.

MATR.AHL   Help file for material and material selection
FILE.AHL   Help file for functions found under the FILES selection
PLAT.AHL   Help file for plating calculations and reports
INTR.AHL   Help file for internals calculations and reports
RUDD.AHL   Help file for rudder calculations and reports
OUTP.AHL   Help file for report generation to printer or disk
KEEL.AHL   Help file for keel calculations and reports