



MSC-WI-C3-02  
February 27, 2019

## MARINE SAFETY CENTER WORK INSTRUCTION C3-02

Subj: GENERATING TONNAGE CALCULATIONS AND CERTIFICATES

Ref: (a) MTN 01-98, as amended, *Tonnage Administrative Policy*  
(b) BP 12, latest revision, *Electronically Signed Marine Safety Center Documents*  
(c) WI C3-03, latest revision, *Tonnage Certification of Navy and Coast Guard Vessels*

1. PURPOSE. To establish the procedure under which tonnage calculations and certificates are generated using the Marine Safety Center's (MSC's) *TonCalc* software application. This Work Instruction is not a substitute for applicable requirements in statutes and regulations, nor is it a substitute for associated interpretations in Coast Guard policy documents.
2. RESPONSIBILITIES.
  - a. Tonnage Division Chief. Ensure overall compliance with this procedure and that *TonCalc* is properly maintained and improved as needed.
  - b. Tonnage Division Staff. Use this instruction when developing tonnage calculations and preparing tonnage certificates for Division Chief signature.
3. IMPLEMENTATION. The enclosures to this document provide information on how to build-out and use *TonCalc* to generate tonnage calculations and certificates.

P. D. EARECKSON  
Chief, Tonnage Division  
U.S. Coast Guard  
By direction

- Encl: (1) Using *TonCalc*  
(2) *TonCalc* Main Menu  
(3) Security and Advanced Features  
(4) Example of *TonCalc* Calculation Output

## Using *TonCalc*

1. **Process Overview.** The user generates tonnage calculations and associated tonnage certifications by first saving a copy of *TonCalc* in the appropriate Project folder, and then inputting required information into the General Data worksheet. Build-out of the applicable calculation worksheet(s) follows, by inserting enclosure and calculation blocks, and by adding and deleting extra lines as necessary. After completing all data entry, the user updates the corresponding *Calculation Results* section(s) and saves/creates an Adobe Acrobat Portable Document Format (pdf) copy of the tonnage certificate(s) and respective calculation worksheets, appending any supplemental calculations (e.g., GHS isometric output), where appropriate. The Tonnage Division Chief completes the process by electronically signing the tonnage certificate(s) in accordance with references (a) and (b), for inclusion in the pdf copy.

2. **Definitions.**

- a. **Build-Out.** The term used to describe the process by which a *TonCalc* user inserts enclosure blocks and calculation or comment blocks within the *Calculations* section of a calculation worksheet to permit subsequent entry of dimensional and descriptive information.
- b. **Calculation Block.** The sub-element within a *TonCalc* enclosure block containing calculations of a particular type (e.g., rectangular, circular, Simpson's First Rule, etc.) An example follows.

RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Wdth (ft)	Hght (ft)	Mult Fact	Tonnage
*Other Machinery: Fr 146-153 C	14.50	16.80	8.50	1.00	20.71

- c. **Calculation Worksheet.** A *TonCalc* worksheet comprising the tonnage calculations for a specific measurement system, or systems, which is organized into three sections: *General Information*, *Calculation Results*, and *Calculations*. There are separate calculation worksheets for the Convention ("CONV CALCS"), Standard/Dual ("STD CALCS"), Simplified ("SIMP CALCS"), and Suez ("SUEZ CALCS") measurement systems.
- d. **Cargo Compartment Block.** The sub-element of the *TonCalc* tonnage calculation worksheet for the Convention Measurement System containing all of the calculations for a single cargo compartment (CC). The cargo compartment block is similar to the enclosure block, described below.
- e. **Category.** A space classification used by *TonCalc* to properly account for certain spaces when executing "Update" procedures. All category labels are assigned using *TonCalc* picklists. Where categories are required, they are preceded by an asterisk, and are color coded as follows: 1) enclosures, enclosed spaces within enclosures, and cargo compartments (\*Blue); 2) exemptible spaces (\*Purple); and 3) deductible spaces (\*Green). Descriptive text may be appended to any category label. However, changes to the label itself could result in data corruption.
- f. **Enclosure Block.** A sub-element within a *TonCalc* tonnage calculation worksheet containing all calculations for a single enclosure, including summary calculations of total volumes. In this context, an enclosure is a distinct structure that bounds an enclosed space or combination of spaces, such as the vessel's under-deck or a superstructure tier. An example of an enclosure block, with calculation blocks inserted, follows.

Enclosure Category: **\*4th Tier**

RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Wdth (ft)	Hght (ft)	Mult Fact	Tonnage
*Deckhouse: Fr 49-51	3.50	17.20	4.30	1.00	2.59
*Deckhouse: Fr 51-55	8.40	20.50	8.00	1.00	13.78

**4th Tier Tonnage As-Measured:** 16.37

RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Wdth (ft)	Hght (ft)	Mult Fact	Tonnage
*Other Machinery: Fr 51-55 S	8.40	9.30	8.00	1.00	6.25

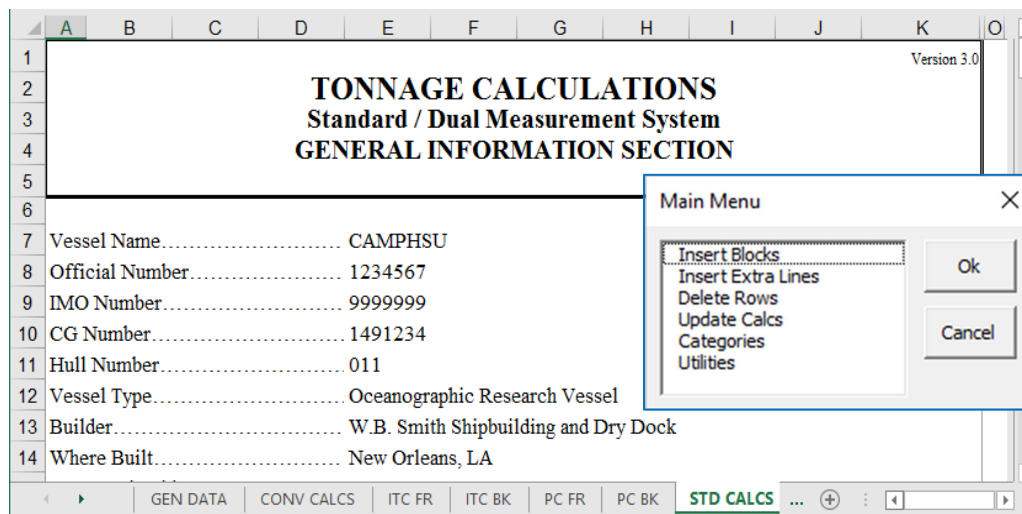
**4th Tier Exemptions:** 6.25

RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Wdth (ft)	Hght (ft)	Mult Fact	Tonnage
*Radio Room: Fr 51-55 P	8.40	6.30	8.00	1.00	4.23

**4th Tier Deductions:** 4.23

- g. General Data Worksheet. The *TonCalc* worksheet that contains vessel identifying information and data of a general nature that is common to the individual calculation worksheets and tonnage certificates, including measurement dates, title/position of the certifying official, and certificate logos.
- h. Main Menu. A specialized *TonCalc* pop-up menu, accessed by right clicking or pressing Ctrl + M, that is used to build-out and perform update operations on the tonnage calculation worksheet, and Utilities functions to import calculations data from older versions of *TonCalc* and transpose Suez calculation details to Suez 3 and 4 worksheets. Refer to enclosure (2) for detailed information about the *TonCalc* Main Menu.
- i. TonCalc. A Microsoft Excel workbook software application developed by the MSC to generate tonnage calculations and associated tonnage certificates. It is organized as a series of individual worksheets, consisting of a single general data worksheet, four calculation worksheets, twelve tonnage certificate worksheets, a "READ ME" worksheet providing disclaimer and other software related information, a "SCRATCH" worksheet, and a "CODE" worksheet for use by *TonCalc* developers, and uses Visual Basic for Applications (VBA) coding to assist users in completing these operations with specialized menus are accessed through the Main Menu. As indicated on the "READ ME" worksheet, the MSC makes no warranties of any kind, either expressed or implied as to any matter including, but not limited to, warranty of fitness for a particular purpose or merchantability, exclusivity or results obtained from use of this software.
- j. Tonnage Calculations. A listing of vessel descriptive information, including a geometrical description of the vessel along with associated volumetric calculations, that serves as the basis for vessel tonnage assignments.

- k. Tonnage Certificate Worksheet. A *TonCalc* worksheet used to generate the front or reverse side(s) of a tonnage certificate.
3. **Inputting Data.** The user enters data into appropriate pre-existing cells (or “fields”) on applicable worksheets, and into user-created fields that are built-out in the *Calculations* sections of tonnage calculation worksheets using *TonCalc*’s specialized menus. Data from the “GEN DATA” worksheet appears in applicable fields of other worksheets, so that an update to this data will be reflected on associated tonnage calculations and certificates. VBA coding and protection features within the workbook help preclude inadvertent insertion, deletion or corruption of data. All data entry fields are shaded yellow. For more information, refer to the section below and enclosure (2) of this document. An image of the *TonCalc* workbook, with the Main Menu activated, follows:



4. **Step-By-Step Procedure.** The paragraphs that follow provide a procedure for generating tonnage calculations and certificates using *TonCalc*. The steps need not necessarily be performed in the order listed, provided all steps affecting tonnage certification are completed prior to tonnage certificate signature. For example, it may be easier to build-out calculations and complete the entry of all required data for a single enclosure before proceeding to build-out calculations for another enclosure. Also, update operations may be performed at any time during the build-out and data entry process, at the user’s option.
- a. “GEN DATA” Worksheet. Enter general vessel data into the “GEN DATA” worksheet, as provided by the submitter/owner on the measurement application, accompanying drawings, and or other information included in the submittal package. Note that the information in the *Remarks* block of this worksheet is not replicated on the calculation worksheets. Use the Override button (normally hidden) when using *TonCalc* to estimate Convention tonnages for vessels that are under 79 feet in overall length, recognizing that once the Override button is pressed, the process cannot be reverted, without closing out of *TonCalc*.
- b. Calculations Build-Out. Generate volume calculations by first inserting each enclosure/cargo compartment (as applicable) into the *Calculations* section of the corresponding *TonCalc* calculation worksheet. This is done by first selecting a cell that will mark the beginning location of the block to be inserted, and then using through the Main Menu to insert the block. This is illustrated in the series of steps and images that follow.
- (1) Select a cell where the enclosure block is to be inserted.

- (2) Use the Main Menu to insert an enclosure block.

Total Deductions	
Net Register Tonnage (unrounded)	
Net Register Tonnage (NRT)	

CALCULATIONS SECTION	
<input type="text"/>	END OF CALCULATION SHEET

**Main Menu**  
Insert Blocks  
Insert Extra Lines  
Delete Rows  
Update Calcs  
Categories  
Utilities

Ok  
Cancel

 → 

**Insert Menu**  
Enclosure Block  
Calculation Block  
Comment Block or Appended Lines  
Logos for Certificates

Ok  
Cancel

- (3) Select the appropriate enclosure Category from the picklist.

**Enclosure Categories (Std / Dual)**  
Under-Deck  
Between-Deck  
Break  
1st Tier  
2nd Tier  
3rd Tier  
4th Tier  
5th Tier  
6th Tier  
Other Endosure  
Hatchway

Ok  
Cancel

- (4) Select a cell where the Calculation Block is to be inserted.

Total Deductions	
Net Register Tonnage (unrounded)	
Net Register Tonnage (NRT)	

CALCULATIONS SECTION	
NOT UPDATED!	
Enclosure Category: *	Under-Deck
<input type="text"/>	
Under-Deck Tonnage As Measured: 0.00	
Under-Deck Exemptions: 0.00	
Under-Deck Deductions: 0.00	
END OF CALCULATION SHEET	
NOT UPDATED!	

- (5) Use the Main Menu to insert a Calculation Block.

**Main Menu**  
Insert Blocks  
Insert Extra Lines  
Delete Rows  
Update Calcs  
Categories  
Utilities

Ok  
Cancel

 → 

**Insert Menu**  
Enclosure Block  
Calculation Block  
Comment Block or Appended Lines  
Logos for Certificates

Ok  
Cancel

 → 

**Insert Calculation Blocks**  
Circular  
Excluded Volume (Conv only)  
General Volume  
Mean Breadth and Height  
Rectangular  
Simpson's First Rule  
Triangular

Ok  
Cancel

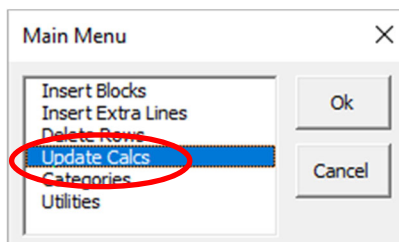
- (6) Select the appropriate enclosed space Category from the picklist.

CALCULATIONS SECTION			
<b>NOT UPDATED!</b>			
Enclosure Category: *Under-Deck			
GENERAL VOLUME CALCULATION			
Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Tonnage
*Hull		1.00	0.00
		1.00	0.00
		1.00	0.00
		1.00	0.00
		1.00	0.00
Under-Deck Tonnage As Measured:			0.00

- (7) Through the Main Menu, add or delete Calculation Block lines as needed.

GENERAL VOLUME CALCULATION			
Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Tonnage
*Hull		1.00	0.00

- c. Enter Frame Locations and Dimensions. After building out the worksheet, append the frame location (or equivalent) and enter the dimensional data for each space listed within each calculation block. You may copy and paste category labels, dimensional data, and other information from unprotected cells to facilitate data entry. You may also delete data, including category labels. A sample completed tonnage calculation worksheet for the Standard Measurement System is attached as enclosure (4).
- d. Update the Results Section.
- (1) *TonCalc* does not automatically update the *Calculation Results* section when changes are made to the *Calculations* section of the calculation worksheet. Therefore, once you have finished entering data or making any other changes to the *Calculations* section, you must perform an update operation from the Main Menu.

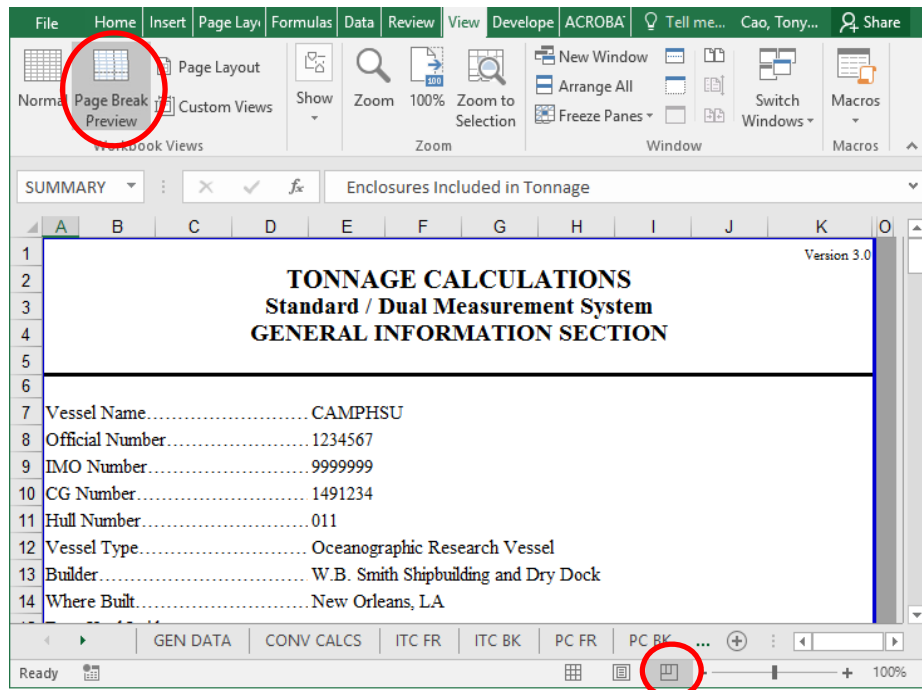


- (2) A red “**NOT UPDATED!**” warning is displayed in all calculation worksheet headers following any data entry within the *Calculations* section. The warning disappears immediately following an Update operation.

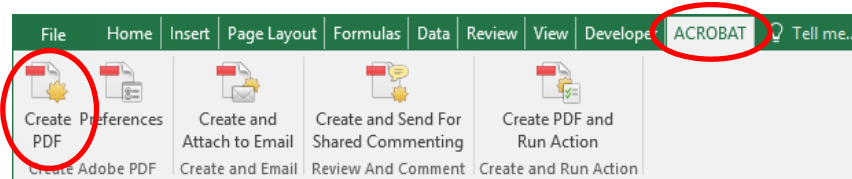
CALCULATIONS SECTION
<b>NOT UPDATED!</b>

5. Create PDF Copies. Create PDF copies of the respective tonnage calculations and certificates for signature and recordkeeping. The Print function can be used to print a worksheet or certificate to a PDF file if you select Adobe PDF as the printer. However, embedded image resolution might be distorted due to Adobe’s default settings. An alternative to print to PDF is to create a PDF file using a function under the Excel’s ACROBAT menu.

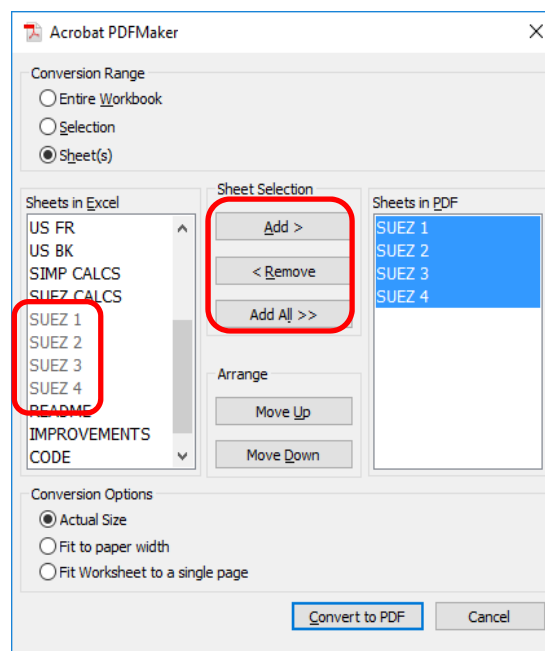
- a. Utilize the print preview to check for page fit and size. Use Page Break Preview from the View menu or the shortcut on the lower right corner to adjust page width and page break locations as needed. Note that you have to switch out of Page Break Preview in order to use the *TonCalc* Main Menu.



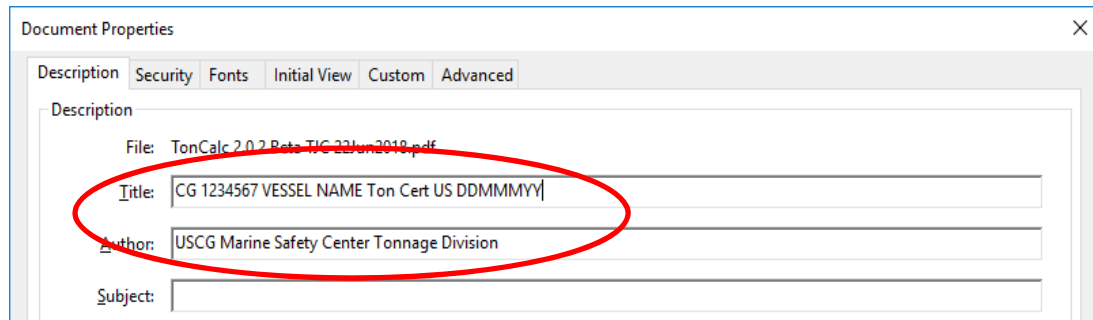
- b. Go to Acrobat menu, and click on Create PDF.



- c. From the Acrobat PDFMaker popup window, select the sheet(s) you want to create to PDF from the left pane, use Ctrl + click if you want to select multiple files.



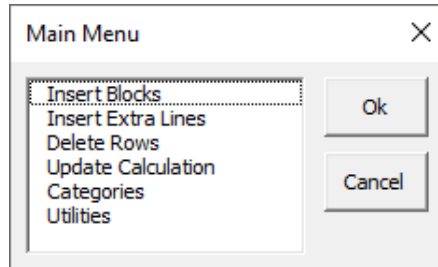
- d. Once you have selected the sheet(s), click Convert to PDF and save the file to the Correspondence folder. Follow reference (c) for file naming conventions.
- e. Document properties can be modified in the generated PDF files. With the PDF file open, press Ctrl + D. You can then update the Title to match the file name and the Author to “USCG Marine Safety Center Tonnage Division”. Save and exit when you have done editing.



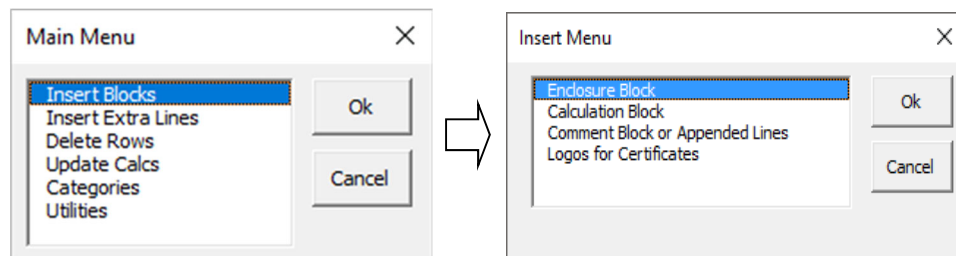


### ***TonCalc* Main Menu**

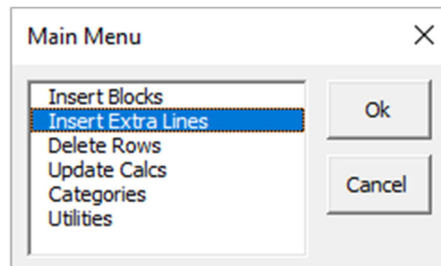
1. **General.** All specialized *TonCalc* menus are accessed through the Main Menu (right click or Ctrl + M), illustrated below, with sub-menus accessed by selecting the appropriate menu item. This enclosure provides brief descriptions of each Main Menu item and any related sub-menus. Note that after highlighting a selectable main menu item, you must click on OK to execute.



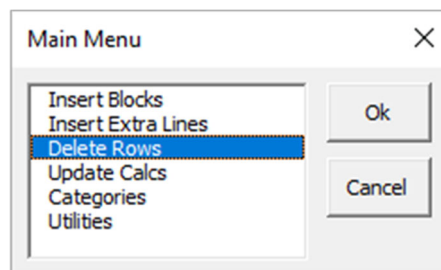
2. **Insert Blocks.** Select this item to build-out the *Calculations* section of a tonnage calculation worksheet. Upon hitting “Ok”, *TonCalc* opens a sub-menu from which the user chooses among various options (e.g., inserting enclosure blocks, calculation blocks, or comment blocks).



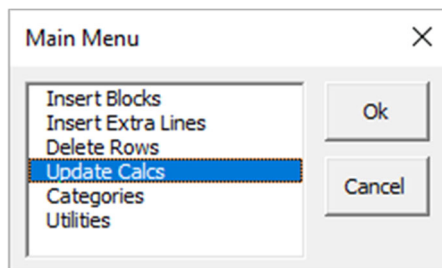
3. **Insert Extra Lines.** Select this item to insert extra line(s) into a calculation or comment block within the *Calculations* section of a tonnage calculation worksheet.



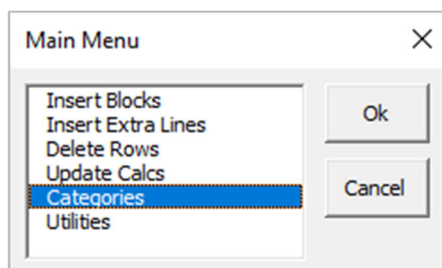
4. **Delete Rows.** Select this item to delete row(s) within the *Calculations* section of the tonnage calculation worksheet. Once selected, it will delete all selected row(s), or the rows(s) associated with selected cell(s), within authorized sections of the calculation worksheet. Refer to enclosure 2 for additional details on deleting rows using this menu.



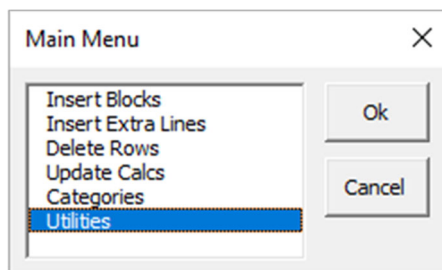
5. **Update Calculation.** Select this item to update the *Calculation Results* section of a tonnage calculation worksheet. Once selected, it will use VBA coding to loop through each row of a worksheet's *Calculations* section, automatically transcribing applicable data into the *Calculations Results* section. To alert the user to possible data entry changes affecting the *Calculation Results* section, a red “**NOT UPDATED!**” warning message will appear in the worksheet header blocks if data entry occurs subsequent to an update operation.



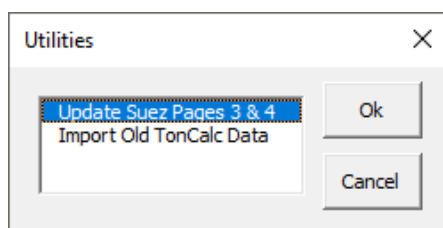
6. **Categories.** Select this item to enter pre-defined categories for enclosures, exemptible and deductible space. These categories are preceded by an asterisk and are color coded as follows: 1) enclosures, enclosed spaces within enclosures, cargo compartments (**\*Blue**); 2) exemptible space (**\*Purple**); 3) and deductible space (**\*Green**). Once selected, this will open sub-menus, from which the user can enter the appropriate category label into the selected cell. Once entered, the user may then append descriptive text to the category label (e.g., frame locations).



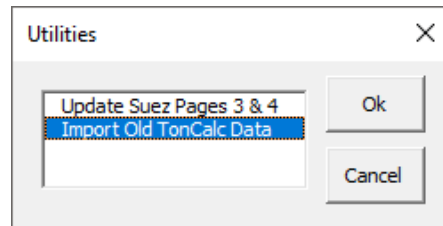
7. **Utilities.** Select this item to import calculations data from older versions of *TonCalc* and to transpose Suez calculations details to Suez 3 and 4 worksheets.



- a. Update Suez Pages 3 and 4. Select this item to transpose space calculation details to Suez Pages 3 & 4. Refer to Enclosure 3 for additional details on using this menu item.

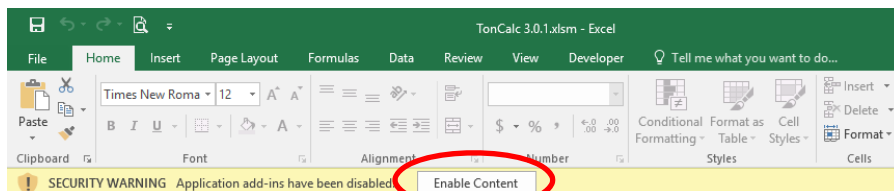
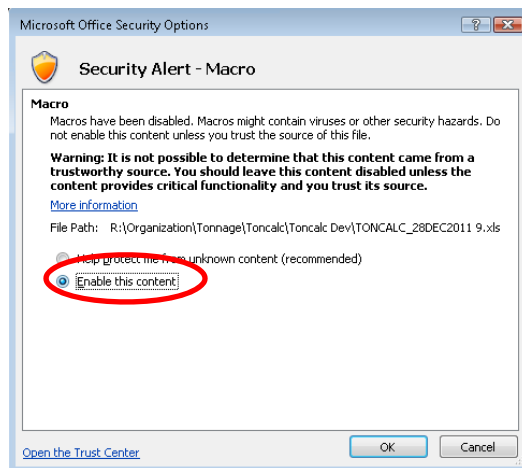


- b. Import Old *TonCalc* Data. Select this item to import *TonCalc* calculations data from *TonCalc* versions 2.0.1 or newer. Refer to Enclosure 3 for additional details on using this menu item.

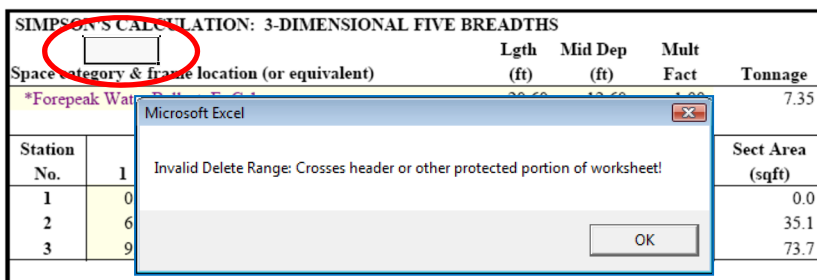


## Security and Advanced Features

1. **Enabling Macros.** You must “enable” macros to use the customized menus and other *TonCalc* features to permit the build-out and updating of *TonCalc*. The following “Security Alert” illustrates the correct macro setting selection. You should also Enable Content if any application add-ins have been disabled.



2. **Protection.** Certain cells and cell ranges within *TonCalc* are protected, preventing users from overwriting or inappropriately inserting deleting cells, data and/or formulas. In general, you may enter data in any unprotected *TonCalc* cell. Note that manually unprotecting any *TonCalc* worksheet can result in corrupted data and/or incorrect calculation results.
3. **Deleting.** You may delete data in any unprotected cell, using normal Excel protocols (e.g., highlighting the unprotected cells and hitting the “Delete” key). No other deletions are permitted, except for the deletion of rows that were added by users through the Main Menu “Insert” item. Deletion of such rows is accomplished by positioning the cursor within the row, or rows, to be deleted, and then selecting the “Delete” item on the Main Menu. If the selected row or rows involve certain headers or other reserved areas of a worksheet, an error message will display giving the user some indication of why the operation could not be completed. For example, an entire calculation or space block (or series of such blocks) may be deleted, but an error message will appear if the delete range crosses a header for a block which is not deleted in its entirety, as illustrated below.



4. **Inserting.** While you may enter data into any unprotected cell, you may not alter the structure of any *TonCalc* worksheet by inserting columns or rows, except through the Main Menu insert item, when building-out a calculation worksheet. This insert item effectively performs an Excel “Insert Sheet Rows” operation at the selected row or cell, and then copies the associated enclosure or calculation block, or selected number of extra lines, into the newly created rows, thereby “building out” the calculation worksheet. It is important to select a cell, or cells, in the location where the block or extra line(s) will be inserted. An error message will display if a block or extra line is added in an incorrect location within the workbook (e.g., the user attempts to insert a calculation block that is not contiguous with a preceding block). Refer to the examples below.

#### Correct cell selection to insert new calculation block

Enclosure Category: \*2nd Tier

RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Width (ft)	Hght (ft)	Mult Fact	Tonnage
*Deckhouse: Fr 32-36	8.70	25.80	7.60	1.00	17.06
*Deckhouse: Fr 36-46	19.60	26.50	8.50	1.00	44.15
*Deckhouse: Fr 46-58	23.80	20.50	8.50	1.00	41.47

2nd Tier Tonnage As-Measured: 102.68

#### Incorrect cell selection to insert new calculation block

Enclosure Category: \*2nd Tier

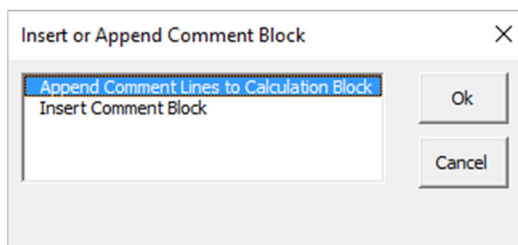
RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Width (ft)	Hght (ft)	Mult Fact	Tonnage
*Deckhouse: Fr 32-36	8.70	25.80	7.60	1.00	17.06
*Deckhouse: Fr 36-46	19.60	26.50	8.50	1.00	44.15
*Deckhouse: Fr 46-58	23.80	20.50	8.50	1.00	41.47

Microsoft Excel

Invalid Insert Location: must be aligned with the top or bottom of a Calculation Block or the line preceding an enclosure or CC tonnage/volume summary!

2nd Tier Tonnage As-Measured: 102.68

5. **Free Form Calculations.** *TonCalc* allows you to generate “free form” calculations, through insertion using the Append Comment Lines sub-menu item for the calculation from the Main Menu, and then referencing the calculated volume via a general volume calculation block entry. Enter appropriate formulas, data, and labels in the unprotected cells within this block. An alternate approach is to append comment lines at the bottom of a general volume calculation block for the calculations, as illustrated below.



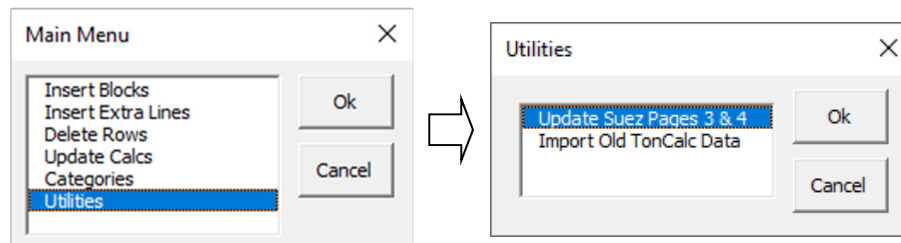
GENERAL VOLUME CALCULATION			
Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Tonnage
*Other: Radar Dome Fr-56-58	239.0	1.00	2.39
Volume of Sphere:	Radius	Volume	
4/3 Pi R^3	(ft)	(cubft)	
	3.85	239.04	

6. **Updating Suez Pages 3 and 4.** This Utilities Menu feature allows you to transpose propelling machinery and upper deck space calculation details to pages 3 and 4 of the certificate.

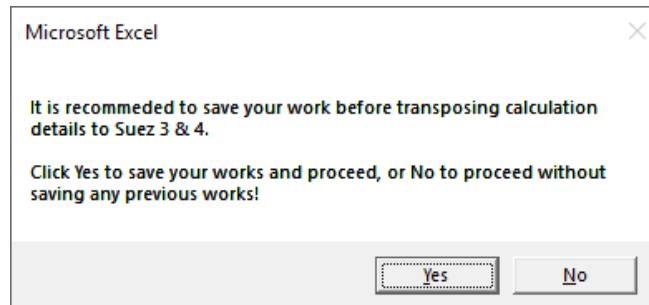
- a. Group Propelling Machinery Spaces. In order for this feature to work properly, it is important that you group all spaces in their own enclosure block for each tier as shown in the example below.

RECTANGULAR CALCULATION					
Space category & frame location (or equivalent)	Lgth (ft)	Width (ft)	Hght (ft)	Mult Fact	Tonnage
*Propelling Mchry (2nd Dk Lvl Casing)	10.00	10.00	10.00	1.00	10.00
*Propelling Mchry (2nd Dk Lvl Casing)	10.00	10.00	10.00	1.00	10.00
*Propelling Mchry (2nd Dk Lvl Casing)	10.00	10.00	10.00	1.00	10.00

- b. Utilities Menu. Bring up the Main Menu and select Utilities, then select Update Suez Pages 3 & 4.

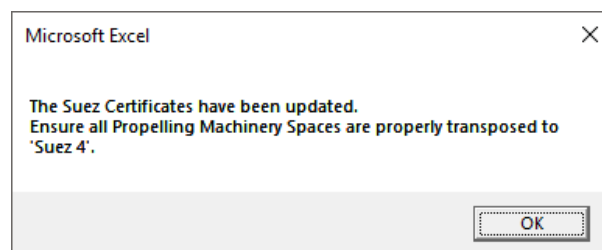


- c. Save Work. You will be prompted if you want to save your work. Selecting either Yes or No will proceed to the next step.

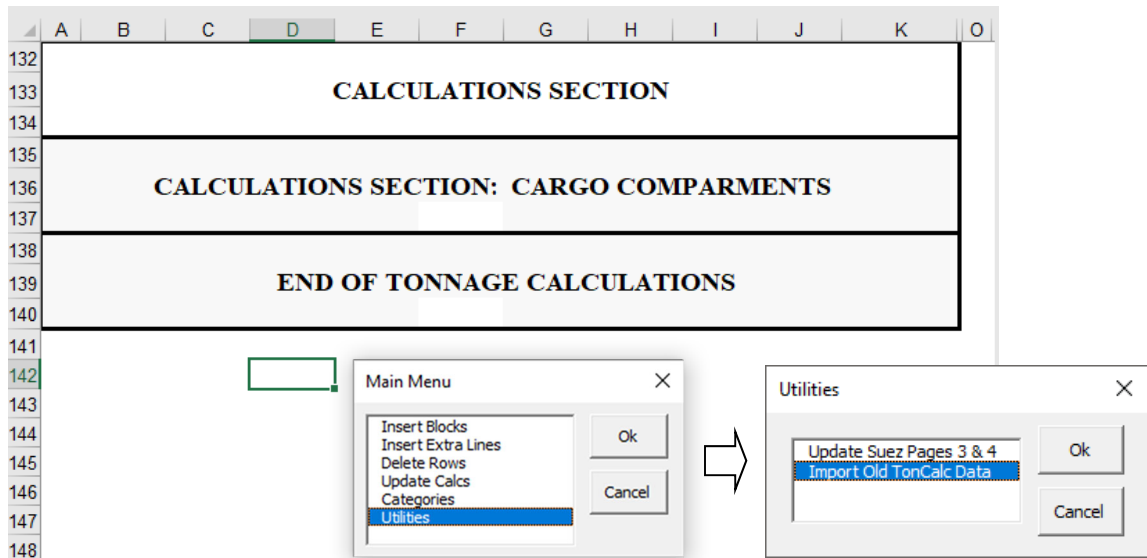


- d. Mapping. The built-in VBA coding will map over propelling machinery, enclosed and exempted spaces, and/or double bottom information to pages 3 and 4 of the Suez certificates. This process could take up to a minute depending on how much information is being mapped. If the data being mapped cannot be fit in the pre-programed pages, you will have to manually create additional page(s) and map over any existing data.

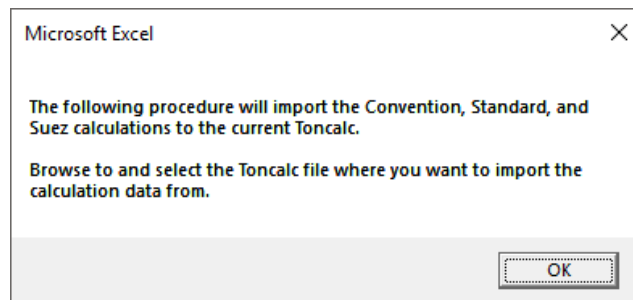
- e. Verify Completeness of Mapped Data. Once complete, verify that all enclosed and exempted spaces on the Suez 3 worksheet(s), and propelling machinery spaces on the Suez 4 worksheet are properly mapped over.



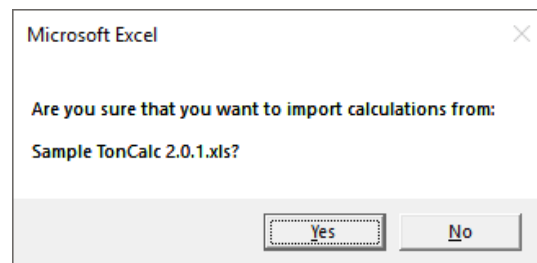
7. **Import Old *TonCalc* Data.** This Utility Menu feature allows you to import Convention, Standard, and Suez *calculations* data from older versions of *TonCalc* (version 2.0.1 and newer) in order to take advantage of the latest format and error checking features.
- a. **Utilities Menu.** In the *TonCalc* that you are working on, activate any of the calculation worksheet. Right click on any cell to bring up the Main Menu and select Utilities, then select Import Old TonCalc Data, and click Ok. This feature is programed to insert copied data to the first row under each Calculations Section.



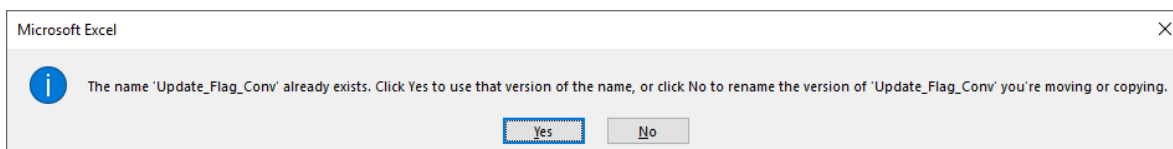
- b. **Select File.** You will receive a few prompts during this process. The first one prompts you to browse to the folder where the old *TonCalc* file is located and select the file.



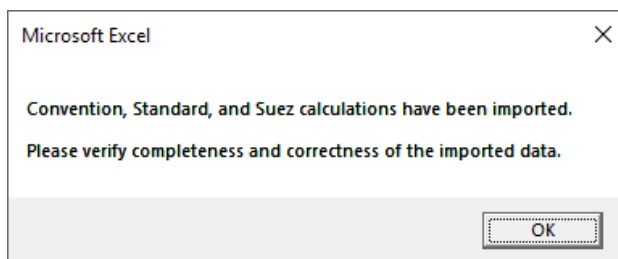
- c. **Confirm Selected File.** Then you will be ask to confirm if the selected file is right file to be imported. Note that once you click on yes, this process will be irreversible.



- d. Existing Names. If you are prompted to use update existing names, you must click on Yes to avoid an infinite loop of renaming.



- e. Verify Completeness of Imported Data. After your calculation data is imported, cycle through the calculation worksheets to ensure the data ranges look acceptable.



- f. Update Imported Calculations. Update the calculations, and compare the updated values to the existing *TonCalc* if there is any difference.
8. **Comments**. Enter clarifying remarks or other comments within the *Calculations* section of a tonnage calculation worksheet through the insertion of a comment block in the appropriate location, or appending comment lines at the end of a calculation block. Enter text into any unprotected cell within this block.
9. **Copying and Pasting Data**. In general, data may be copied from any unprotected cell to another unprotected cell, or even from another *TonCalc* worksheet (e.g., a sister vessel worksheet) and pasted into an unprotected cell or cells. It is prudent to use the “Paste Special Values” Excel option when performing such an action, to avoid unintended formatting changes that may occur (e.g., incorrect font size or unwanted borders).
10. **Moving Data**. Under no circumstances should you attempt to move data within any *TonCalc* worksheet using normal Excel protocols (e.g., drag and drop). This can, and almost certainly will, result in data corruption. An acceptable work-around is to cut and then paste data into the desired new location, which may involve first building-out a space or calculation block to accommodate the data in the new location.
11. **Saving *TonCalc***. Although *TonCalc* has proven reasonably resilient to crashes or other unexpected instabilities, it is prudent to “save often” to prevent data loss. Also, consider saving prior to executing any “Delete” operation from the Main Menu. There is no way to “Undo” such an operation, should portions of the worksheet be deleted unintentionally.



# TONNAGE CALCULATIONS

## Convention / Panama Canal Universal Measurement System

### GENERAL INFORMATION SECTION

Vessel Name..... SAMPLE  
 Official Number..... ON 1234567  
 IMO Number..... IMO 7202554  
 CG Number..... CG 1234587  
 Hull Number..... 110  
 Vessel Type..... Fish Processing Vessel  
 Builder..... Southeastern Steel and Iron Works  
 Where Built..... Savannah GA  
 Date Keel Laid..... 1944  
 Date Substantially Altered..... 2001  
 Date Completed..... 1945  
 Passengers (cabins <= 8 berths)..... 0  
 Other Passengers..... 0  
 Convention Msmt (B)..... B  
 Regulatory Msmt (C, D, E)..... C  
 Self Propelled (Y/N) ?..... Y

(m) (ft)  
 L stem/stern on 85% wl..... 103.69 340.2 (this is the length before applying 0.96)  
 L stem/rudder stock on 85% wl..... 102.11 335.0  
 Other L (add remark).....  
 Extreme Breadth (for Panama).....  
 Max Allowed Draft.....  
 Moulded Draft..... 6.52 21.4

	Reg Dim Ind (X)	Length		Breadth		Depth	
		(m)	(ft)	(m)	(ft)	(m)	(ft)
Convention	X	102.11	335.0	21.31	69.9	8.69	28.5
Hull (Overall)		105.10	344.8				
Pre-1990							

#### REMARKS

All general volumes are taken from GHS output unless otherwise indicated.

Tonnage Surveyor

T.S. Eliot

Org

USCG

Date

02-25-2019

## CALCULATION RESULTS SECTION

### Enclosure Volume Summary

Enclosure	Location	Length (m)	Volume (cubm)
Underdeck	---	---	20164.51
1st Tier	Fr 15-60	8.71	7279.55
2nd Tier*	Fr 16-60	8.71	4509.26
3rd Tier	Fr 16-60	4.05	738.64
4th Tier	Fr 16-23	2.77	162.50
Other	Various	Various	70.20

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**Total Volume Enclosed Spaces (cubm):** 32924.66

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### Excluded Space Description Summary

2nd Tier Overhang
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**Cargo Compartment (CC) Volume Summary**

<b>Compartment</b>	<b>Location</b>	<b>Length (m)</b>	<b>Volume (cubm)</b>
Proc 1st Tier	Fr 15-50	6.29	6987.83
Proc 2nd Tier	Fr 15-50	6.29	4267.94
Cargo Hold 1	Fr 5-9	2.42	261.00
Cargo Hold 2	Fr 30-35	2.73	411.53
Cargo Hold 3	Fr 60-65	2.73	411.73

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**Total Volume Cargo Spaces (cubm):** 12340.03

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V	= total volume all enclosed spaces in cubic meters	32924.66
K1	= $0.2 + 0.02\log(V)$	0.290350
$(4d/3D)^2$	= factor not greater than unity	1.000000
$K2 \cdot V_c \cdot (4d/3D)^2$	= factor not less than 0.25 GT	3477.75
V <sub>c</sub>	= total volume of cargo spaces in cubic meters	12340.03
K2	= $0.2 + 0.02\log(V_c)$	0.281826
K3	= $1.25 (GT + 10000)/10000$	2.444961
D	= molded depth amidships in meters	8.69
d	= molded draft amidships in meters	6.52
N1	= # passengers in cabins with not more than 8 berths	0
N2	= # other passengers	0
N1+N2	= if N1+N2 less than 13, N1 & N2 shall be taken as 0	0
Convention Gross	= gross tonnage (GT): K1 * V	9559.69
<b>Convention Gross (GT ITC)</b>		<b>9559</b>
Convention Net	= net tonnage: $K2 V_c (4d/3D)^2 + K3 (N1+N2/10)$ not less than 0.3 GT	3477.75
<b>Convention Net (NT ITC)</b>		<b>3477</b>
DA	= average depth $V / (\text{Length} \times \text{Moulded Breadth})$	15.13
K4	= $\{0.25 + [0.01 \times \log(V)]\} \times 0.830$	0.244995
K5	= $[\log(DA-19)] / \{[\log(DA-16)] \times 17\}$ or "0"	0.000000
PC/UMS Net Tonnage	= $K4 V + K5 V$	8066.39
<b>PC/UMS Net Tonnage (Rounded)</b>		<b>8066</b>

## CALCULATIONS SECTION

Enclosure Category: **Underdeck** Location: --- Lgth (ft): ---

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Underdeck	712103.0	1.00	712103.0

**Underdeck Volume (cubic ft):** 712103.0

Enclosure Category: **1st Tier** Location: Fr 15-60 Lgth (ft): 28.6

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Deckhouse, Fr 15-60	257075.0	1.00	257075.0

**1st Tier Volume (cubic ft):** 257075.0

Enclosure Category: **2nd Tier\*** Location: Fr 16-60 Lgth (ft): 28.6

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Deckhouse, Fr 16-60	159243.0	1.00	159243.0

### EXCLUDED SPACE LISTING

Space category & frame location (or equivalent)	Brief Description (for Certificate)
2nd Tier Overhang, Fr 56-60	2nd Tier Overhang

**2nd Tier\* Volume (cubic ft):** 159243.0

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<b>Enclosure Category:</b>	<b>3rd Tier</b>	<b>Location:</b>	Fr 16-60	<b>Lgth (ft):</b>	13.3
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**GENERAL VOLUME CALCULATION**

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Deckhouse, Fr 16-60	26084.8	1.00	26084.8

**3rd Tier Volume (cubic ft):** 26084.8

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<b>Enclosure Category:</b>	<b>4th Tier</b>	<b>Location:</b>	Fr 16-23	<b>Lgth (ft):</b>	9.1
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**GENERAL VOLUME CALCULATION**

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Deckhouse, Fr 16-23	5738.6	1.00	5738.6

**4th Tier Volume (cubic ft):** 5738.6

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<b>Enclosure Category:</b>	<b>Other</b>	<b>Location:</b>	Various	<b>Lgth (ft):</b>	Various
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**GENERAL VOLUME CALCULATION**

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
P/S Funnel, Fr 65-67	780.0	1.00	780.0
Crane Posts, Fr 56	195.0	1.00	195.0
Crane Cab, Fr 55-56	59.0	1.00	59.0

**RECTANGULAR CALCULATION**

Space category & frame location (or equivalent)	Lgth (ft)	Wdth (ft)	Hght (ft)	Mult Fact	Volume (cubft)
Seasonal Trailers, Fr 52-58	20.00	8.50	8.50	1.00	1445.0

**Other Volume (cubic ft):** 2479.0

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## CALCULATIONS SECTION: CARGO COMPARTMENTS

**Cargo Compartment:** **Proc 1st Tier**      **Location:** **Fr 15-50**      **Lgth (ft):** **20.7**

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Proc 1st Tier, Fr 15-50	246773.0	1.00	246773.0

**Proc 1st Tier Volume (cubic ft):** 246773.0

**Cargo Compartment:** **Proc 2nd Tier**      **Location:** **Fr 15-50**      **Lgth (ft):** **20.7**

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Proc 2nd Tier, Fr 15-50	150721.0	1.00	150721.0

**Proc 2nd Tier Volume (cubic ft):** 150721.0

**Cargo Compartment:** **Cargo Hold 1**      **Location:** **Fr 5-9**      **Lgth (ft):** **8.0**

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Cargo Hold 1, Fr 5-9	9217.0	1.00	9217.0

**Cargo Hold 1 Volume (cubic ft):** 9217.0

**Cargo Compartment:** **Cargo Hold 2**      **Location:** **Fr 30-35**      **Lgth (ft):** **9.0**

### GENERAL VOLUME CALCULATION

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Cargo Hold 2, Fr 30-35	14533.0	1.00	14533.0

**Cargo Hold 2 Volume (cubic ft):** 14533.0

**Cargo Compartment:** **Cargo Hold 3** **Location:** **Fr 60-65** **Lgth (ft):** **9.0**

**GENERAL VOLUME CALCULATION**

Space category & frame location (or equivalent)	Volume (cubft)	Mult Fact	Volume (cubft)
Cargo Hold 3, Fr 60-65	14540.0	1.00	14540.0

**Cargo Hold 3 Volume (cubic ft):** 14540.0

**END OF TONNAGE CALCULATIONS**