

## THE DEVELOPMENT OF A SOFTWARE FOR CALCULATION OF LAYDAYS, DEMMURAGE AND DESPATCH

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**Abstract:** A software product development involves stages such as: analysis, design, writing, testing, debugging and maintenance. Although they are considered separate steps, there is a strong interdependent relationship among them, the ultimate goal being to obtain an efficient software solution that can evolve over time.

In accordance with this, a personal challenge was to develop a software in an academic scope with a friendly-use interface which can easily substitute the classical method calculation of lay-days, demurrage and despatch for a ship which can load or unload cargo, helpful for both teachers and students. The main objective was to emphasize in more detail through the stages aforementioned the embodiment of the software EaSyCalc V.0.1. , developed entirely in the Matlab software environment.

**Key words:** lay-days, demurrage, despatch, ship, Matlab

### 1. Introduction

Generally speaking, the code implementation represents the text writing using the format and the syntax of a desired programming language.

In our case the chosen language was what the Matlab software environment offers. It is very important to mention that Matlab is at the same time a programming language and a development system that integrates computation, visualization and programming in a user-friendly environment (easy-to-use), problems and solutions being expressed in an accessible mathematical language.

During the implementation stage of the code basically two files result. The first is the gross algorithm implementation and the second is the result of working with graphical user interface option, GUI, which the same Matlab environment software offers. Even if the two files are independently created, in the assembly stage both of them have been required.

The particularity that the final form of the program possesses is that it is an executable program that allows the user to install the software on any Windows operating computer, without a version of Matlab needing to have been installed.. The explanation for this is simple: the step to create the executable is performed using a compiler called Matlab Compiler, compiler integrated with Matlab software, which in turn uses a routine called Matlab Compiler Runtime (MCR). In larger terms, this routine is an independent set of shared libraries that are installed automatically with the first installation of an executable file created in Matlab, allowing the program running to run under optimal conditions.

### 2. The testing stage of EaSy Calc Software V .01.

In order to test our software we must perform an activity sequence of testing such as the following:

- The input dates

Based on the data provided by the charter party and the history of loading/discharge operations, the following data will be taken into account as input parameters for our program:

- Vessel name: MV Rapsody
- Commodity name: soya beans
- Cargo quantity: 6000 t
- Lay days: fixed
- Vessel arrived on roads: 16/11/2000 09:00
- NOR tendered: 17/11/2000 10:30
- Time allowed for loading/discharging): 04 00 00
- Operation type: loading
- Clause type: SHEX
- Demurrage rate: 4000\$
- Despatch rate:-: 2000\$
- Loading commenced: Thursday November, 17 2000 at 13:00
- Loading completed: Friday, 25 November 2000 at 17:00
- The laydays will start at 08.00 the next working day, the day the ship immediately forwarded the NOR
- The period from Friday 12:00 to Monday 08:00 will not count as lay days even if used
- Lay days worked before to the start of lay days will not count as lay days.

- The output data

According to the classical solving method, the result would be that we have 2 days and 13 hours of demurrage. After the conversion of this period to money, it will finally result that the charterer will have to pay the ship-owner demurrage worth of \$ 10.166.

- The execution environment

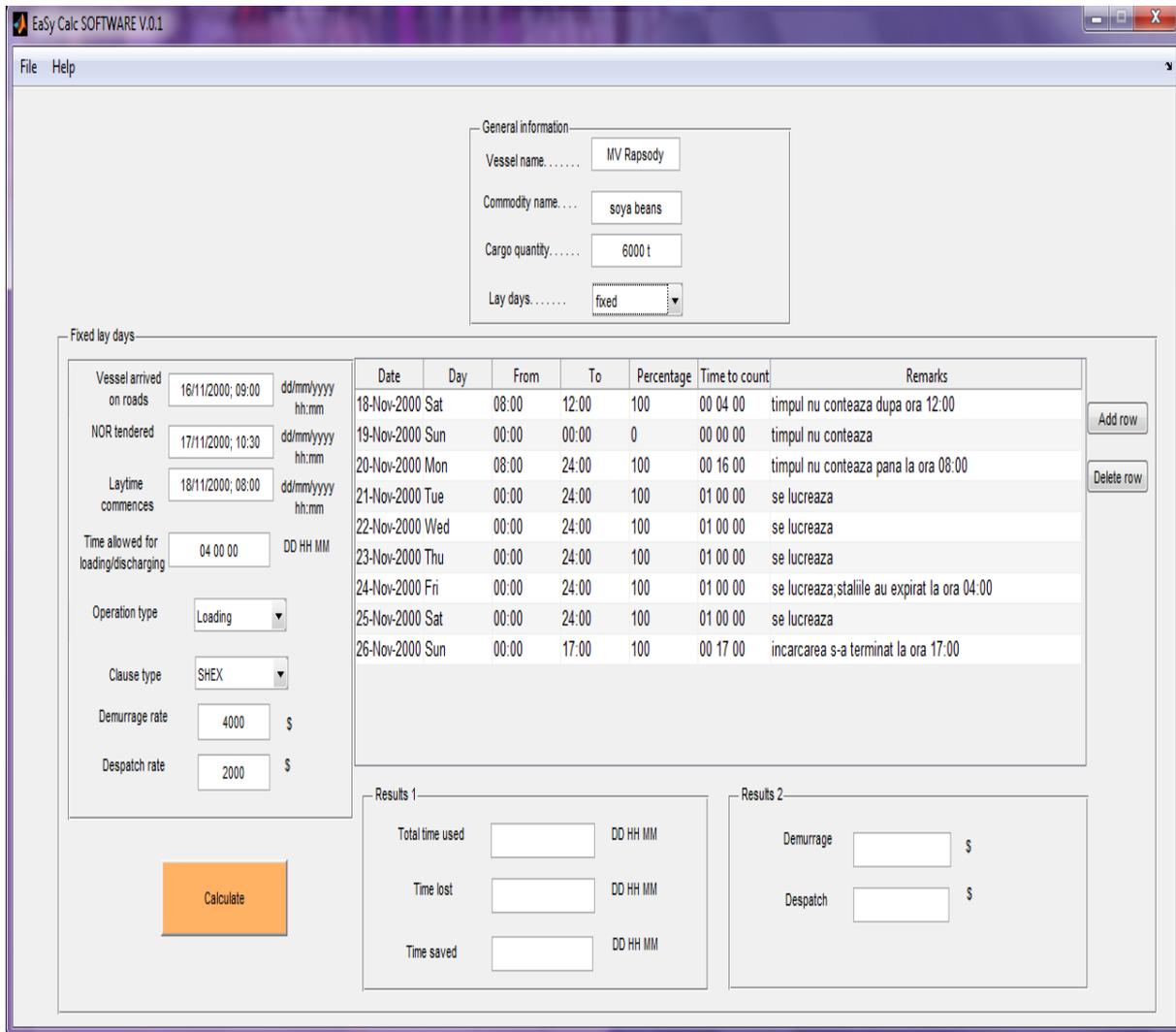


Figure 1 - The execution environment –Example

- Program execution results

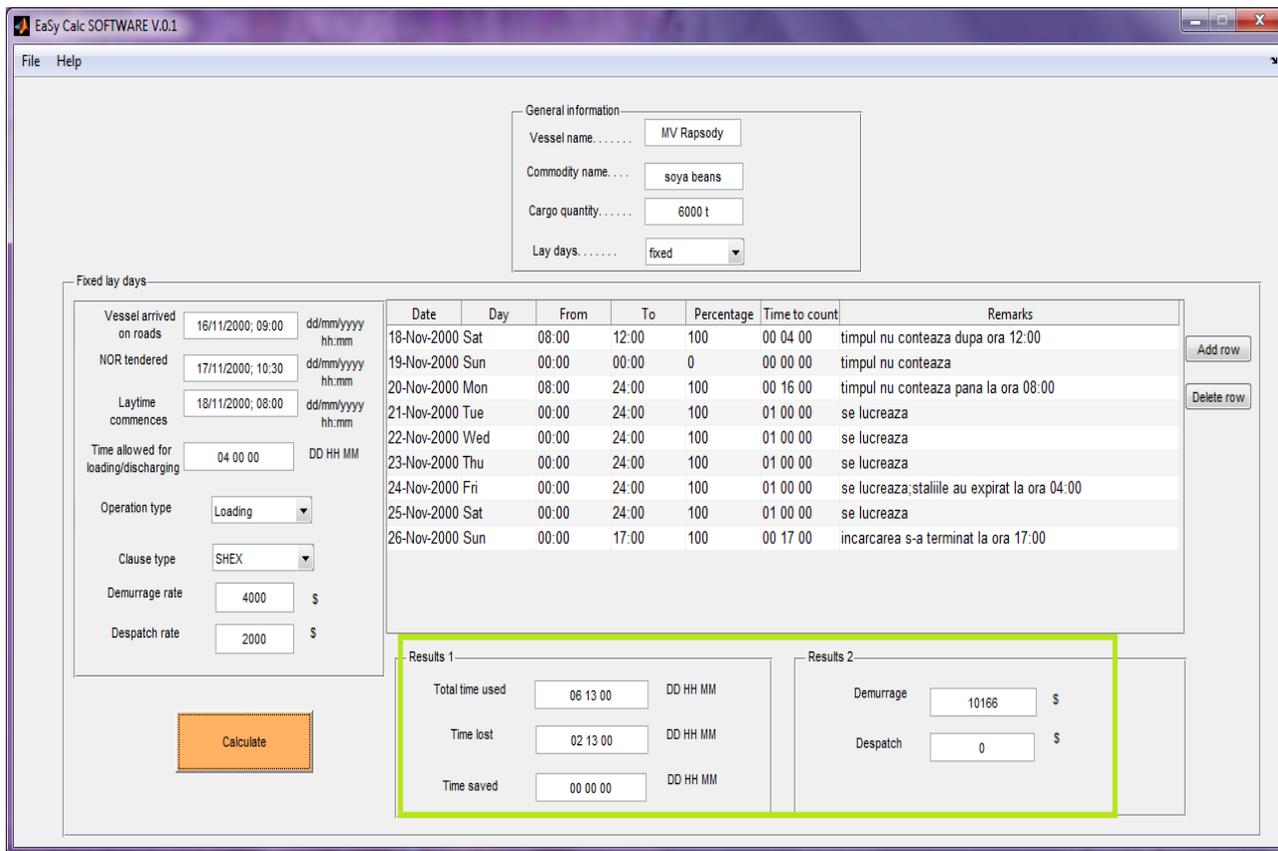


Figure 2 – The result after the execution

- Analyze the results

Comparing the results obtained with the classical method we can see that with Easy Calc Software we obtained the same one.

- Associate test verdict

The program passed the check test.

### 3. Other adjacent functions of the EaSy Calc V.0.1 software

In accordance with the previous section, the most important part, namely the functionality of the software, was successfully fulfilled. The following part is desired to be a general overview of the entire program and also of other adjacent functions that the program has.

To start with, when the program is launched in execution a start window opens (Figure 3).

launch, the program it is necessary to activate the START button from the start window. A new window will open (Figure 4). In this new window there is a menu which consists of two items: File and Help (Figure 5), but also a panel which allow us to set essential dates such as: vessel name, commodity name, the amount of freight, and also the most important, the type of lay days used in solving the problem: fixed or determinable. When we select the type of lay days, we have the option to start a new record (Figure 6) or to run a program already stored (Figure 7).

Also in the File tab beside the option presented before there are functions such as: Save, and New. The first of which, Save, allows us to save an already solved problem in a file (Figure 8), and the second the beginning of a new record.

The second tab, Help contains two sub-items: How to use (Figure 9) and About (Figure 10)



Figure 3 – Starting window

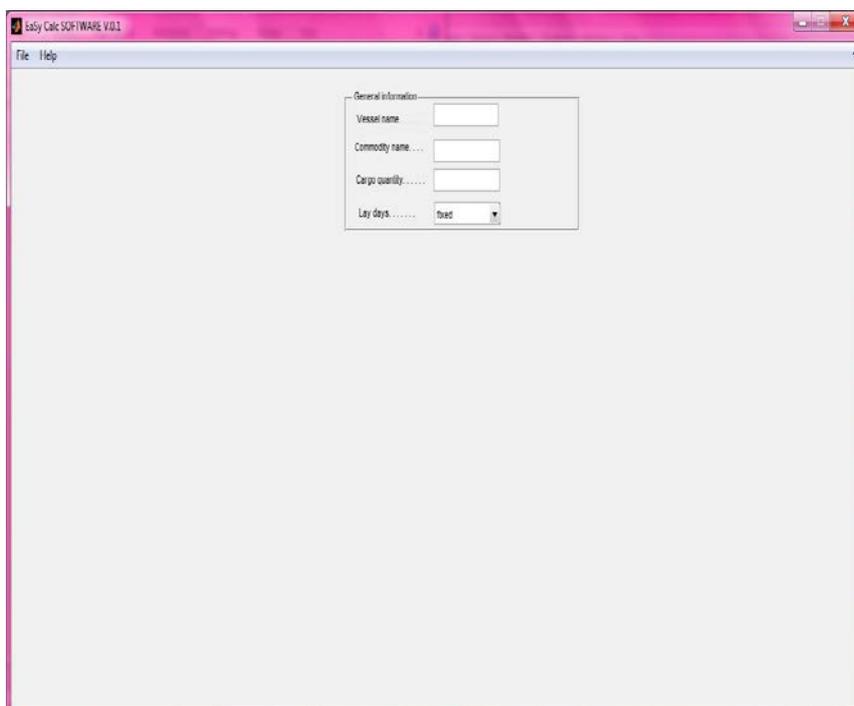


Figure 4 – Main window

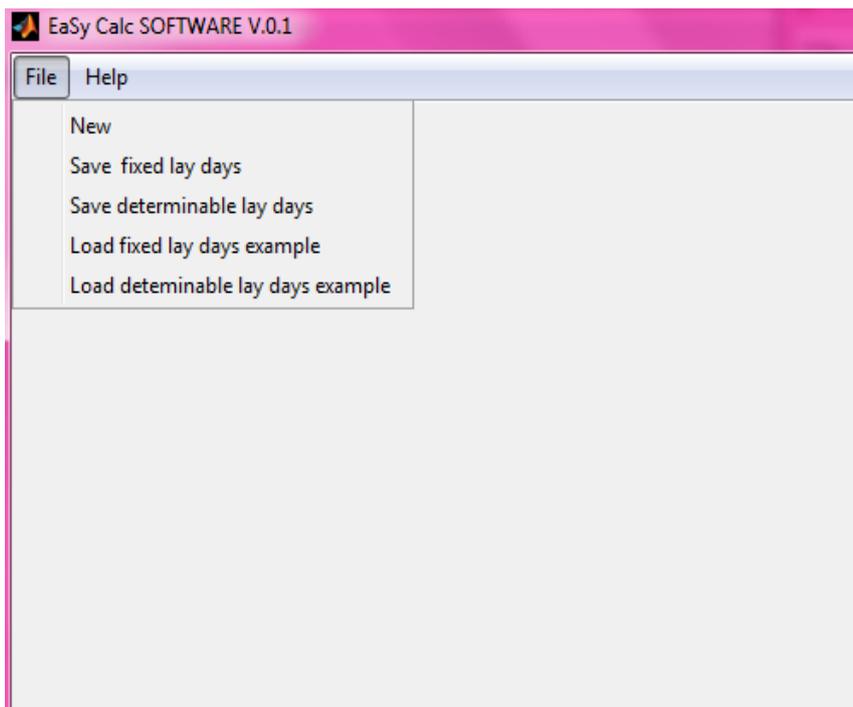


Figure 5 - Sequence program menu

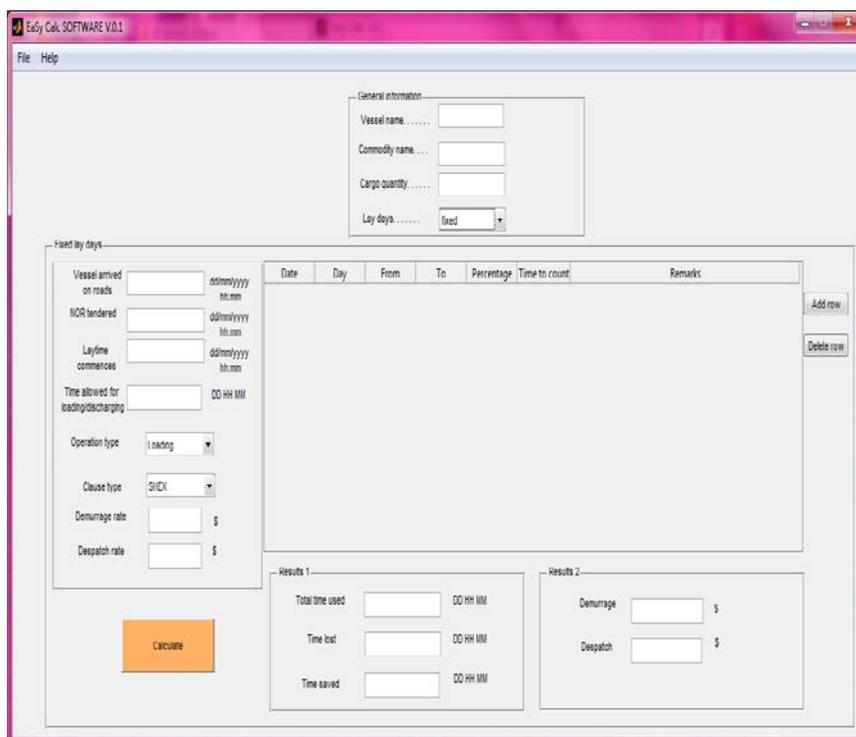


Figure 6 - New record for fixed lay days

General information

Vessel name: M/V Rapsody

Commodity name: soya beans

Cargo quantity: 6000 t

Lay days: fixed

Fixed lay days

Date	Day	From	To	Percentage	Time to count	Remarks
18-Nov-2000	Sat	08:00	12:00	100	00 04 00	timpul nu conteaza dupa ora 12:00
19-Nov-2000	Sun	00:00	00:00	0	00 00 00	timpul nu conteaza
20-Nov-2000	Mon	08:00	24:00	100	00 16 00	timpul nu conteaza pana la ora 08:00
21-Nov-2000	Tue	00:00	24:00	100	01 00 00	se lucreaza
22-Nov-2000	Wed	00:00	24:00	100	01 00 00	se lucreaza
23-Nov-2000	Thu	00:00	24:00	100	01 00 00	se lucreaza
24-Nov-2000	Fri	00:00	24:00	100	01 00 00	se lucreaza; stafiile au expirat la ora 04:00
25-Nov-2000	Sat	00:00	24:00	100	01 00 00	se lucreaza
26-Nov-2000	Sun	00:00	17:00	100	00 17 00	incarcarea s-a terminat la ora 17:00

Results 1

Total time used: 06 13 00 DD HH MM

Time lost: 02 13 00 DD HH MM

Time saved: 00 00 00 DD HH MM

Results 2

Demurrage: 10186 \$

Despatch: 0 \$

Figure 7 - Example stored in the program

STANDARD TIME SHEET							
1.Vessel name:	MV Rapsody	21-Nov-2000	Tue	00:00	24:00	100	01 00 00
2.Commodity name:	soya beans	se lucreaza					
3.Cargo quantity:	6000 t	22-Nov-2000	Wed	00:00	24:00	100	01 00 00
4.Lay days:	fixed	se lucreaza					
5.Vessel arrived on roads:	16/11/2000; 09:00	23-Nov-2000	Thu	00:00	24:00	100	01 00 00
6.NOR tendered:	17/11/2000; 10:30	se lucreaza					
7.Laytime commences:	18/11/2000; 08:00	24-Nov-2000	Fri	00:00	24:00	100	01 00 00
8.Time allowed for loading/discharging:	04 00 00	se lucreaza;staliile au expirat la ora 04:00					
9.Operation type:	Loading	25-Nov-2000	Sat	00:00	24:00	100	01 00 00
10.Clause:	SHEX	se lucreaza					
11.Rate off demurrage:	4000 \$	26-Nov-2000	Sun	00:00	17:00	100	00 17 00
12.Rate of despatch:	2000 \$	incarcarea s-a terminat la ora 17:00					
13.Laytime calculation		13.Total time used:					06 13 00
18-Nov-2000	Sat	08:00	12:00	100	00 04 00		
timpul nu conteaza dupa ora 12:00							
19-Nov-2000	Sun	00:00	00:00	0	00 00 00		
timpul nu conteaza							
20-Nov-2000	Mon	08:00	24:00	100	00 16 00		
timpul nu conteaza pana la ora 08:00							
		14.Time lost:					02 13 00
		15.Time saved:					00 00 00
		16.Demurrage:					10166\$
		17.Despatch:					0\$

Figure 8-Save a new record

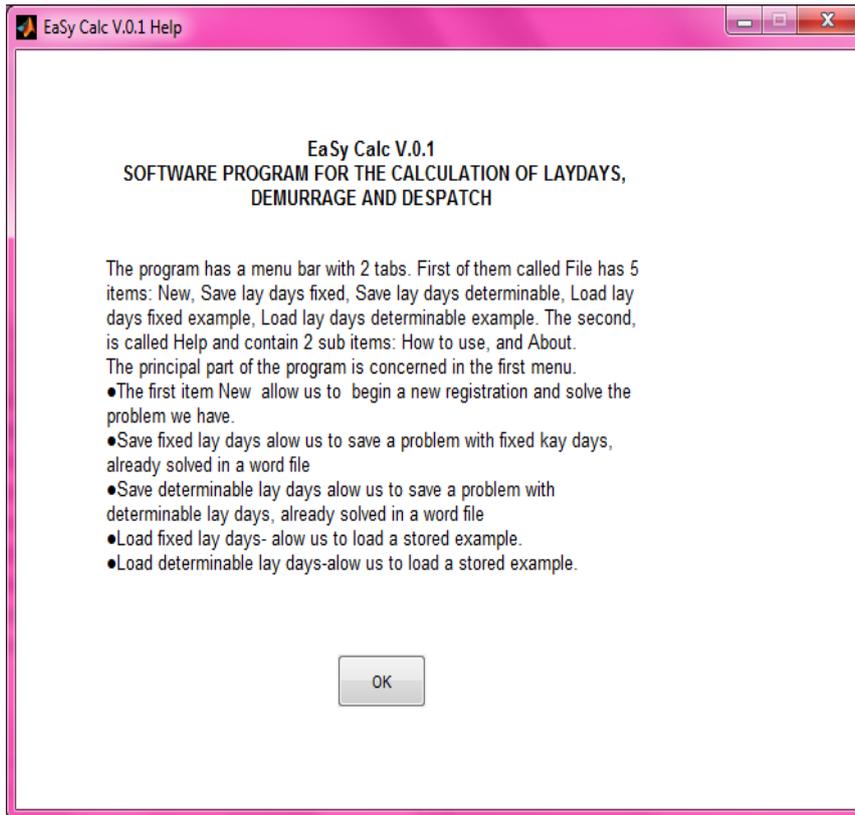


Figure 9-How to use

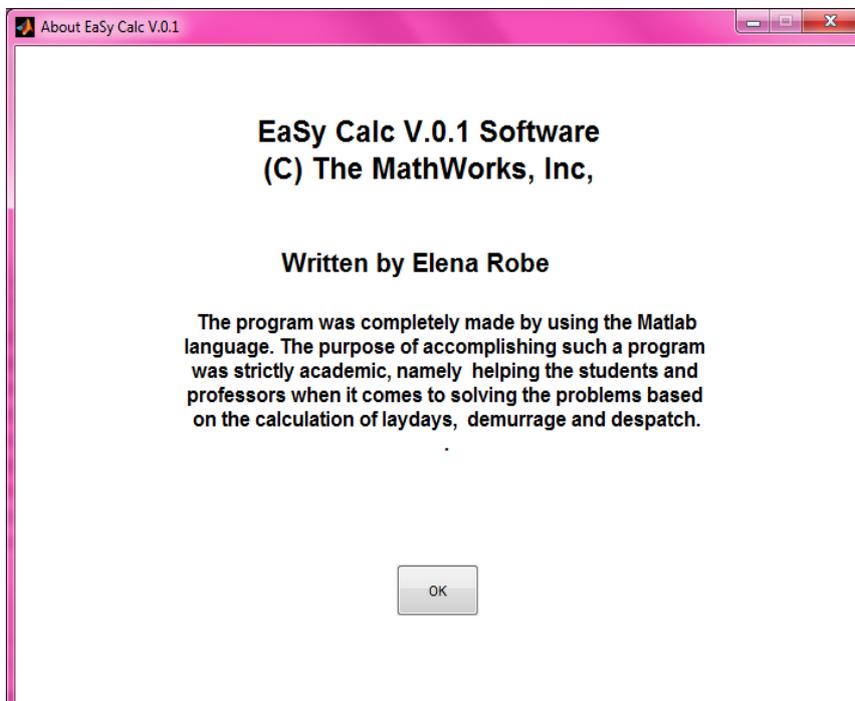


Figure 10-About

### **Conclusion**

The main objective of developing such a software was to accomplish another way of solving, in which teachers, students, and those interested can address and solve problems involving lay days, demurrage and despatch.

On the one hand, this method, based on the classic solution, namely that presented within classes of Commercial Operation of the ship, has managed to create an innovative environment from the point of view of graphic presentation and in terms of solving speed.

On the other hand, when we regard the entire process as a whole and because the research had a technological product as final goal, accomplishing such a program could be viewed as bringing a small but visible contribution to what is called the technological influence change upon phases of economic cycles

However, we must take into consideration the fact that the program is a first version and with any software that appears in versions, further improvement is desired, such as the possibility of including several clauses, printing functionality directly from the program and why not, improved graphics.

Personally, I believe that my goal was achieved, thus succeeding in completing a project through which I can emphasize my personal interest for two important things, namely solving problems involving lay days, demurrage and despatch, and my passion for the Matlab language.

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