Vessel Parametric Seat Modeling for Change Enhanced Usability

Soon-kak Kwon¹, Kyung-seok Kim² ^{1,2}Dep. of Computer Software Engineering, Dongeui University, Korea

Abstract:- Vessel designers have to go through many processes of input/change of numerical values of each part on vessel seat since the implementation of the automation of vessel design drawings. This paper is intended to relieve the consequent discomfort and provide convenience by identifying something in common in the series of steps and making a routine out of the found common facts.

Keywords:- Vessel, Seat Modeling, Standard Type, Special Type

I. INTRODUCTION

There are many courses and skills in nesting processing. Some processes, which are not necessary during the work, come up and interrupt the courses of nesting such as losing face of processes and missing some delicate parts of the work. For fixing such problems, the nesting is proposed to provide convenience and better work performances[1,2]. Three functions are trim, polyline, and overline. Those can improve the nesting processing speed and save the product resources. Recently a lot of vessel design drawings are generated thanks to the design automation. Among these drawings, those with different forms of numerical measurement are considered to be different vessel seat even if their shape is very similar or exactly the same. Like this, if there are similar drawings when they are being generated, the efficiency of drawing generation can be improved by only modifying the dimensions of the drawings rather than generating new drawings. In addition the convenience may be maximized by programming a series of overlapping processes.

To implement this, knowledge is necessary on the overall functionality of the AM and modifying of the seat. On UI, which provides the convenience, are shown the information that the user requires, 3D configuration, and the shape to be changed to.

This better optimization is expected to be applied to other designs such as heavy industries as well as the vessel's seat.

II. CHANGING THE PARAMETRIC SEAT

Trim connects an object to the other one by finding an intersection point between two objects. Also it gets rid of unnecessary work that is not meant. This course will improve the nesting processing speed. Several series of process are needed in order to modify and identify the attributes and 3D geometry of the seat from the existing AM. After the detailed information on the seat is confirmed from the drafting, more detailed can be viewed or modified by entering commands in the Command Window. The changes in 3D shape can be checked in the out-fitting. Changes in the dimensions, which make 3D shape, can be made of course in the drafting. However, it is inconvenient to change all the materials one by one if the kinds of them of the parts are too many. This kind of problem of repetitive tasks through the Command Window mentioned earlier can be solved by receiving and processing the input values with the implemented program.

Using the implemented UI, faster identification of information that needs changing is possible, and checking the information saved in the CVS file is also possible to find information that does not exist in the AM. In this respect, it is possible to improve working speed, accuracy and readability, and to minimize the execution of the out-fitting for checking of 3D modelling.

III. ALGORITHM OF PROPOSED FUNCTIONS

In Fig 1, information can be imported from the DB in the AM through the name that is set in the seat. Fig 2 shows the modification and saving of the imported information.



Fig. 2: Flow chart of SCTN Length

The currently implemented function is for the length. Since the position becomes other type when changed, the program has been made to allow change only length information and to the extent that the shape can be maintained after the change.

IV. IMPLEMENTATION

The seat name and block shall be output in UI, and the project number is displayed in vessel No. The type of the corresponding seat is displayed in Type. If there is length information on the attributes window, type borrows the same symbol from the CSV file to display; and in case of order code, the order code that has the same length level as the type is brought to be displayed. If there is no information of length, on the other hand, the symbol is left blank and the order code shown in the attributes window is read and displayed. If there is length in the standard type, Kg value is read from the CSV; if not, Usrweight value is imported from attributes window. Special type outputs special-weight value, and if necessary, applies the devised method of calculation for the output.

Vessel Parametric Seat Modeling for Change Enhanced Usability



Fig. 3: Display of seat's information

Design Explorer	Attributes of TWPL	ATE 1 of EQUIPMENT /STS_BCP03
Filter 🔲 Hangers&Supports 🖌	Track CE	
B C EQUIEQ_FA1103	Atribute	Value
B 💣 EQUI STS_FAI102 B 👹 TMPL 1	-	
B DD DOSE 1	ReNo	+17385/125284
⊕ 🗍 RAIE1 utset	Name	TNPLATE 1 of EQUIPHENT (STS_BORDS
- I SCTN 1 unsef	Type	TNP.
B B LOUI STS FA1103 B B THPL 1	Lock	1
🕀 📴 DOSE 1	Owner	575_8CP0
- I SCTN 1 unset	Description	FA16J1
E PRE1 user	Function	unet
E CONE SECS_E2500_E3161 E CONE SECS_E2500_E3161	Purpose	ursel
Equi Eq. 8CP03	Gtipe	und
🕀 👸 EQUI EQ. 8CP04	Number	0
B B EQUI STS_AL2ECC38 B B TWPL 1	Usrveicht	(0.45)
E SET I Later	Usrweight	use
SCTN 2 urset		
F SCTN 3 utset	Usrcogravity	urset
B 👷 EQUI STS_ECROS	Usrvcopraiłty	ursel
B B THPL 1	Uwritit	urset
- D DOSE 1	Type	urset
PRIE1 user	Dáfanay	uted
SCIN1 atter	ORDER-CODE	5082082
G 💣 EQUI STS_BCR4	INSTALLATION	D urset
E PSE1	TMPL_REF	unset
50 DDSE 1		
FAILE 1 utset		
- SCTN 1 unset		
E 2016 100 E000 E0161 E 2010 EFE 1-CE FP001		
a grouters ice prot	*	

Fig. 4: Display of Seat's information

The ChangeLength button, this program's main function receives and modifies the sub-located Length1, Length2 and Length3 values. The displayed information is checked and the Length value is modified using CE button, followed by execution by pushing the ChangeLength button. This time, the modified modeling and information are output once more to check for the changes.

Design Explorer	ņχ	Attributes of SCTN 3 o	FTMPLATE 1 of EQUIPMENT /STS_MP407 0	x						
Filter 🔲 HangersäSupports 🖌		Track CE								
E STEET090 R & 20NE UD1P E000 E3161	^	Atribute	Value		A ParaTEST					E
8 6 20NE 20K GR E000 E3161 8 6 20NE UD19 E2100 E3161		RefNo	+2248341795		Naries					ī
🕀 🛱 STRU SSTS P203 EB-8		Nane	SCTN 3 of THPLATE 1 of EQUIPMENT ISTS, MP407		Nane					
🕀 💣 EQUI EQ. POIS	- 11	Tipe	SCIN		STS_WP407					
🕀 👸 EQUI STS, P20301		Lock	n		Block					
🕀 💣 EQUI EQ_F20331			L		LDIP					
⊕ a EQUI STS_WP406 ⊕ a ² EQUI STS R/107		Owner	TNPLATE 1 of EQUIPMENT (STS_MP407	41 1	Drating info		_			
B C EQUI EQ, RI107		Description	unst		Disargino					
enge caul ca NP406		Function	und		Ship No.	Type				
B at EQUI STS MP403		Purpose	und		S-X00X	FA-2AT				
B & EQUI EQ_MP403		Ghpe	FBIR		Order Code	Symbol				
B & EQUIED PPB 2F4211			1 Jan		5080480					
⊕ a EQUI STS_RL1G11801		Nunber	0		Height	Length				
🕀 🔐 EQUI EQ_RL-1G11801		Desparam	unset			Type1: Unset				
🕀 💣 EQUI STS_MP40701		Buit	Π		Kg				0	
B 🖉 EQUI EQ NE40701		3100	0		Unset					
B 💣 EQUI STS_MP407		Bancle	L .	-			-			
B @ TMPL 1			*		Lengths					
SCTN 1 utset SCTN 2 utset		Dinstart WRT Owner			Length1 154m				×	
SCIN 2 dreef		Dmend WRT Owner	N				e48x366	Paralel	Model Rotate	
€ ge Equi Eq_NP407		Posstart WRIT Owner	E 79mm N Omm D 13mm		Length2 30nn					
B g EQUISTS PFB 2 F4211	- 11	Posend WRT Owner	E 79mm S 30mm D 13mm		Lengt 3					
🗄 🌒 ZOME UD1P EZ200 E3161	- 11	Joistant	Net	11 L						
8 🕎 20NE UD1P_E2300_E3151		Jolend	Net	11 7						
20NE UD1P_E2400_E3161										
20NE UC1P_E2600_E3161		Jire	NA.							
B 20NE UD15_E0000_E3161		Jusine	NA.							
# 🕢 20NE UD15_E2100_E3161 # 🔬 20NE UD15_E2200_E3161		Clystart	uted							
2015 E200 E3161		Clyend	und							
2010 0013 (200 (200	×		stretu							
hat Explorer Marine Drawing Explorer Design Explorer		Stelease								

Fig. 5: Before the process



Fig. 6: After the process

A function to change the position was implemented to make this feature. Though one function is enough for the implementation, it was made for flexible applicability by the type by making functions that change the starting and ending points respectively because flexibility could not be attained if applied by the types.

V. CONCLUTSIONS

The current program may be fully applied, if it can be applied to most types, for parts that have SCTN. Problems are found when positions are changed with PANE included, and when applied by types. At this point, additional work is needed when the DB is updated. If improved a little further, it is expected to provide the convenience through applying and modifying for the specifications including PANE, CONE, CYLI as well as SCTN.

ACKNOWLEDGMENT

The authors would like to thank Cadwin System, Ltd for providing nesting software, CADWIN*NEST. Corresponding author : Soon-kak Kwon (skkwon@deu.ac.kr).

REFERENCES

- [1]. Y. Kim, K. Gotoh, and M. Toyosada, "Automatic two-dimensional layout using a rule-based heuristic algorithm," Journal of Marine Science and Technology, vol.8, pp. 37–46, May 2003.
- [2]. W.-C. Lee, H. Ma, and B.-W. Cheng, "A heuristic for nesting problems of irregular shapes," Computer-Aided Design, vol.40, pp. 625–633, May 2008.