

DeepLines
*User Defined
Keyword Example*



PRINCIPIA



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1 INTRODUCTION

This document presents some examples of User Defined Keywords (UDK) and their setup in DeepLines from version 5.7.

The model is shown below.

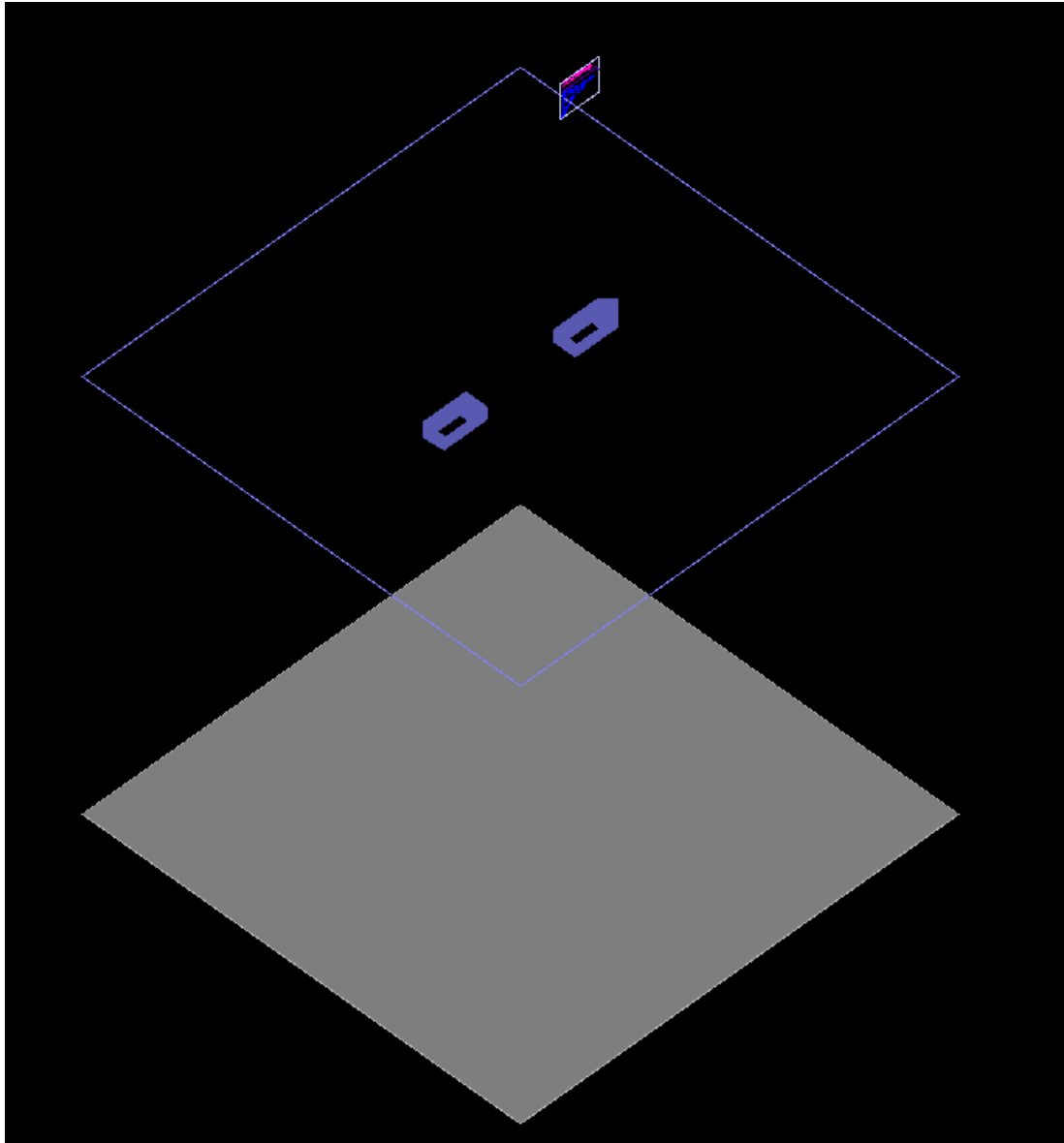


Figure 1-1 : Model used in this example


2 BUILDING THE MODEL

The main elements of the model UDK.dsk are presented in these sections.

2.1 MODEL COMPONENT: FPSO1 AND 2

It has been chosen to use vessels for this example. UDK can also be used with other types of objects: lines, springs...

2.2 MODEL COMPONENT: USERDEFKEYWORD_1

UDK has been added using the following tool bar icon: 

Help on UDK can be found in Home > Model Components > User Defined Keywords.

The following data form can then be edited to define the user defined keyword.

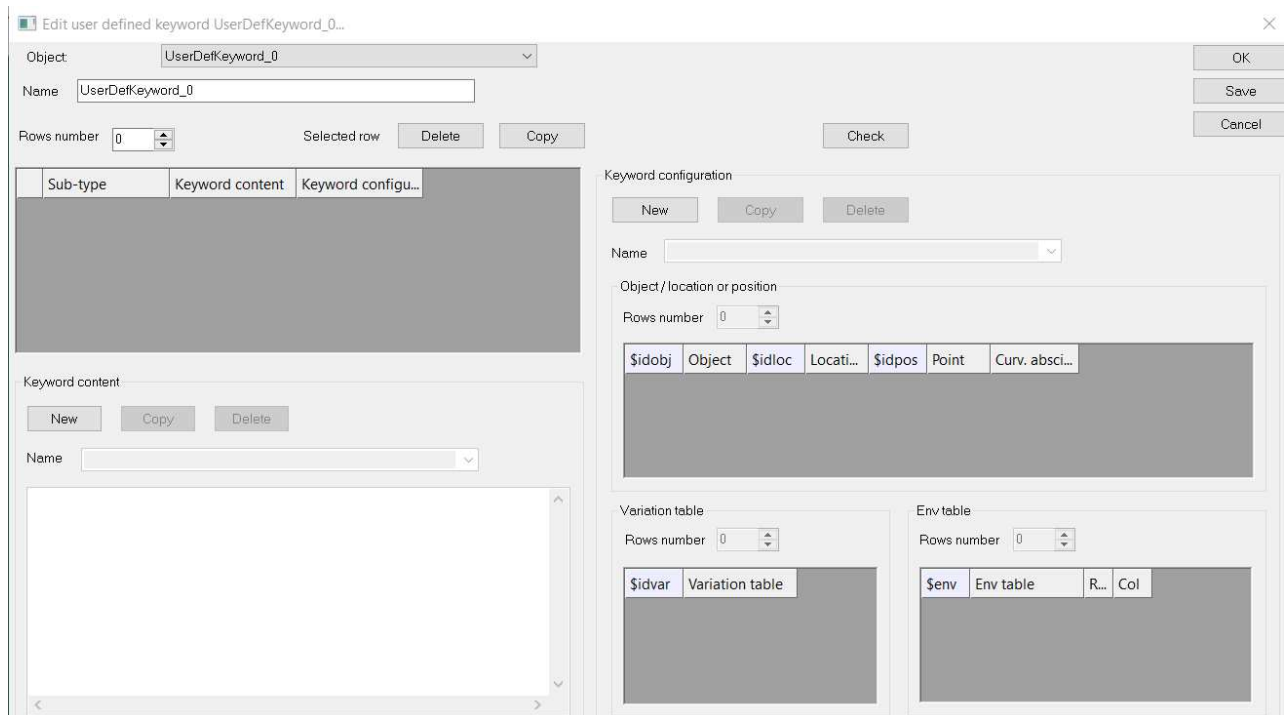
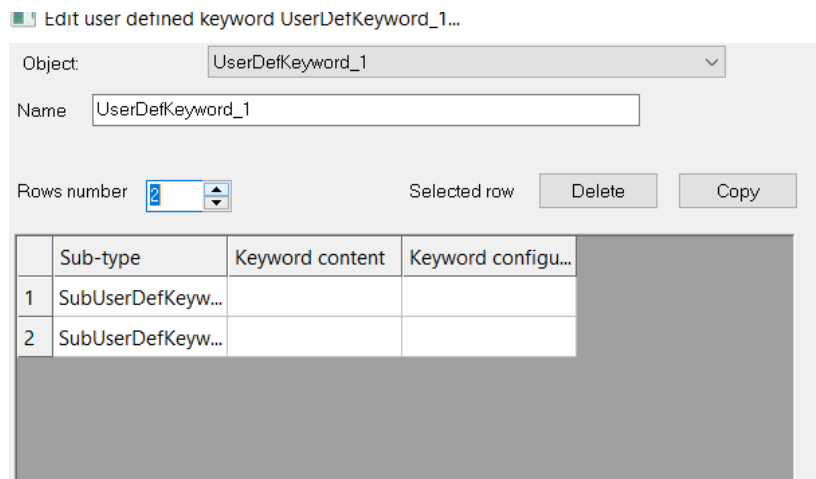


Figure 2-1 : User Defined Keyword setup

For this example, **two rows have been added**



Object: UserDefKeyword_1

Name: UserDefKeyword_1

Rows number: 2

Selected row: [] Delete Copy

	Sub-type	Keyword content	Keyword configu...
1	SubUserDefKeyw...		
2	SubUserDefKeyw...		

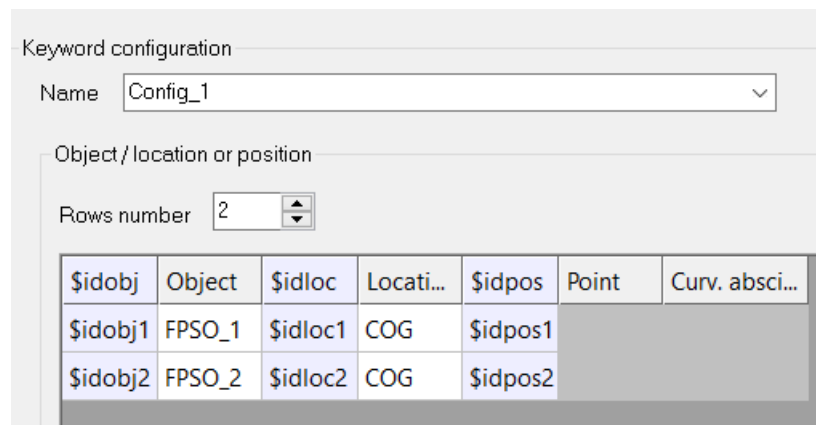
Figure 2-2 : First step: adding rows to have 2 subtypes

The name of the subtype can then be changed. Each subtype should be associated with a keyword content or a keyword configuration. **A keyword content or configuration can be added by clicking on the new button in the relevant section.**

The keyword configuration is first defined since it will provide names that will be used for the definition of the keyword content.

In this example, **two rows number are selected for the object/location or position.**

Objects are associated to each line then location can be selected. It can be noted that an id will be associated with the object and with its location. This id can then be used in keyword content.



Keyword configuration

Name: Config_1

Object / location or position

Rows number: 2

\$idobj	Object	\$idloc	Locati...	\$idpos	Point	Curv. absci...
\$idobj1	FPSO_1	\$idloc1	COG	\$idpos1		
\$idobj2	FPSO_2	\$idloc2	COG	\$idpos2		

Figure 2-3 : Second step: defining the keyword configuration

If required, variations tables can be added to the keyword configuration and an id will also be associated with the variation table. The format of the table needs to be consistent to its use in keyword content.

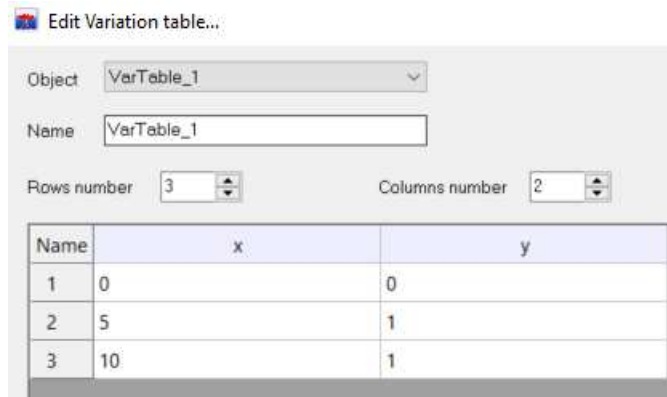


Figure 2-4 : Third step: defining a variation table (outside of UDK editor)

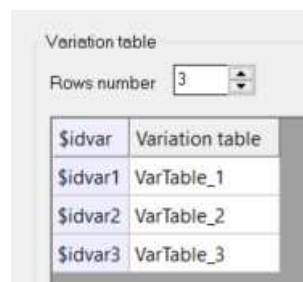


Figure 2-5 : Fourth step: defining variation tables used in UDK

Then the keyword content can be added. Two keyword contents are created in this example. (by clicking twice on the new button of the subsection).

This example used a very simple keyword but any keywords can be used here. The id then replaces node numbers or variation table numbers.

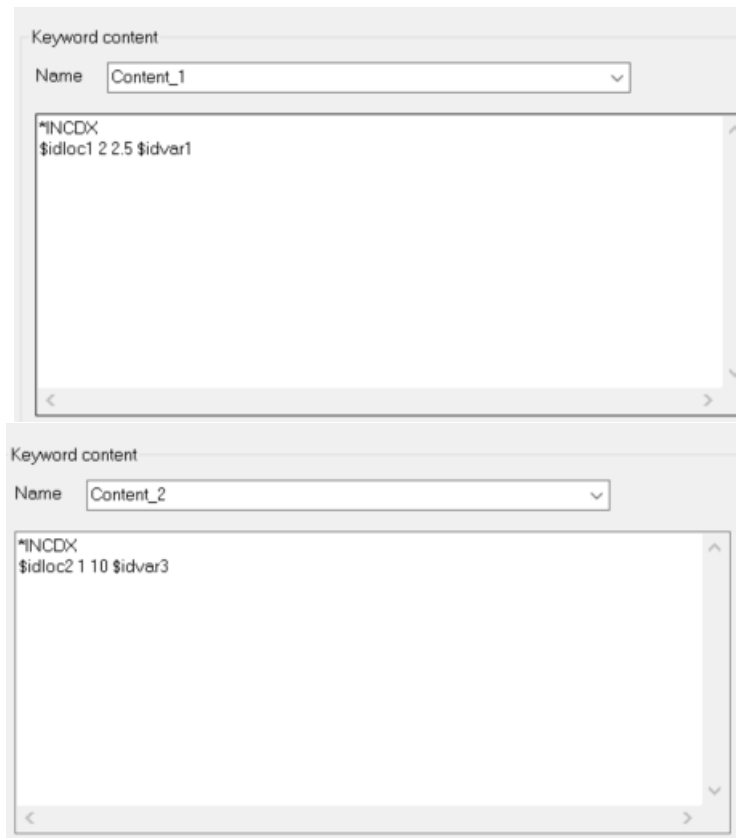


Figure 2-6 : Fifth step: defining keyword contents

Then the keyword contents and keyword configurations are associated with the sub-type.

Sub-type	Keyword content	Keyword configu...
1 Def1	Content_1	Config_1
2 Def2	Content_2	Config_1


Figure 2-7 : Associating sub-type to keyword contents and configurations

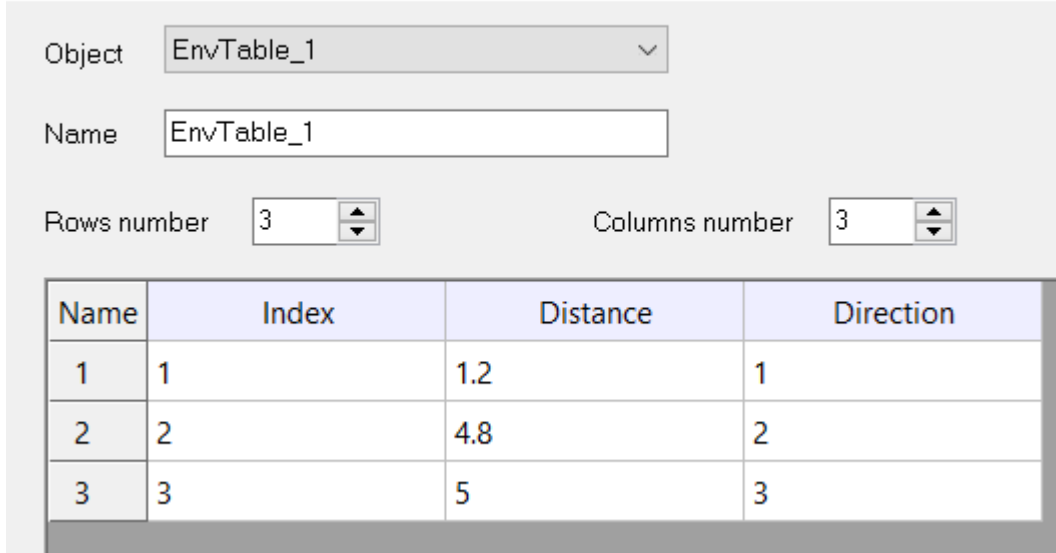
To summarise, this User Defined Keyword asks:

- To move the COG of FPSO_1 (config_1, 1st object) in the Y direction by 2.5 m (2 and 2.5 in keyword content) linearly between step 0 and 5 (VarTable_1)
- To move the COG of FPSO_2 (config_1, 2nd object) in the X direction by 10 m (1 and 10 in keyword content) linearly between step 15 and 20 (VarTable_3)

2.3 MODEL COMPONENT: USERDEFKEYWORD_2

USERDEFKEYWORD_2 is an example using an EnvTable:

 Edit Variation table...



Name	Index	Distance	Direction
1	1	1.2	1
2	2	4.8	2
3	3	5	3

Figure 2-8 : Environment table used in this example

The keyword content and keyword configuration can be used in all user defined keyword.

To summarise, this User Defined Keyword asks:

- To move the COG of FPSO_2 (config_2, 1st object) in the direction and with the amplitude defined in EnvTable_1 (Figure 2-8) linearly between step 0 and 5 (as defined in VarTable_1, see Figure 2-4). The first line of the environment table will be used for an analysis and the line corresponding to the analysis for an analysis set. For example, in an analysis set, the second analysis will move the floater of 4.8m in the Y direction.

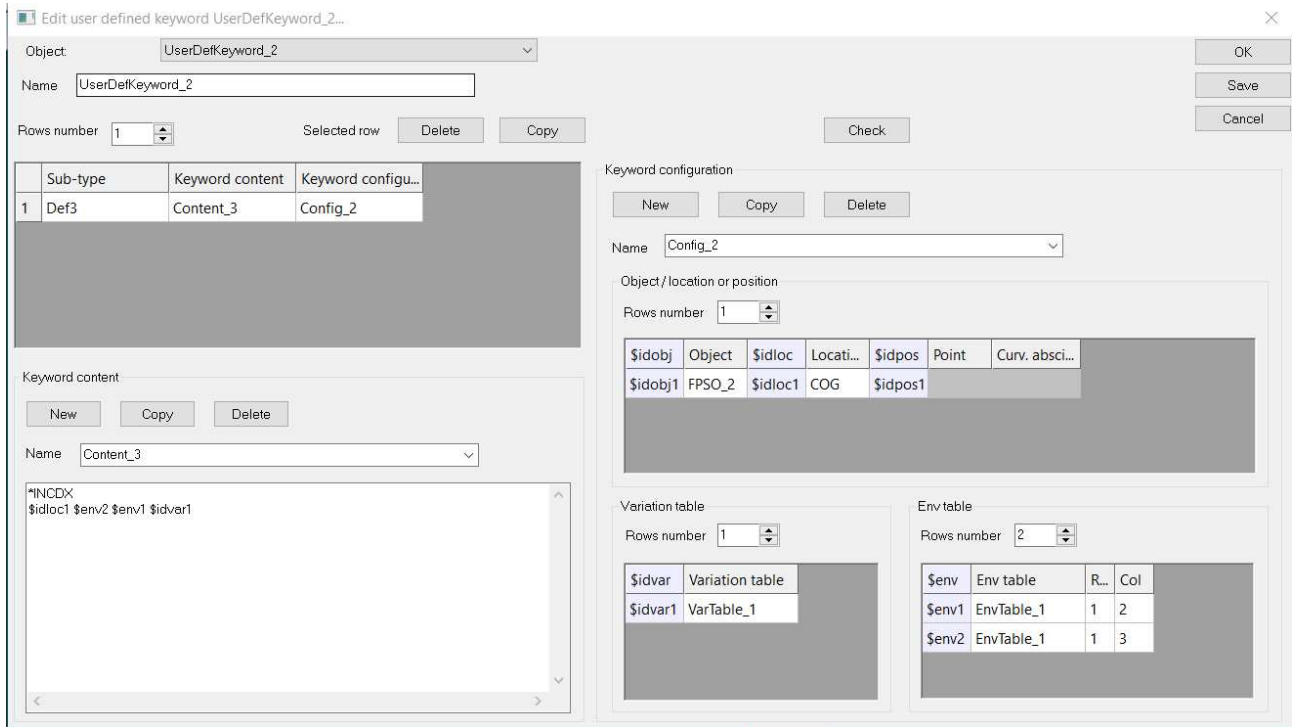


Figure 2-9 : Definition of UserDefKeyword_2

2.4 MODEL COMPONENT: ENVIRONEMENTSET_1

In the general sheet, the User Defined Keyword should be ticked to be applied in the analysis set. Main swell has also been selected in this example.

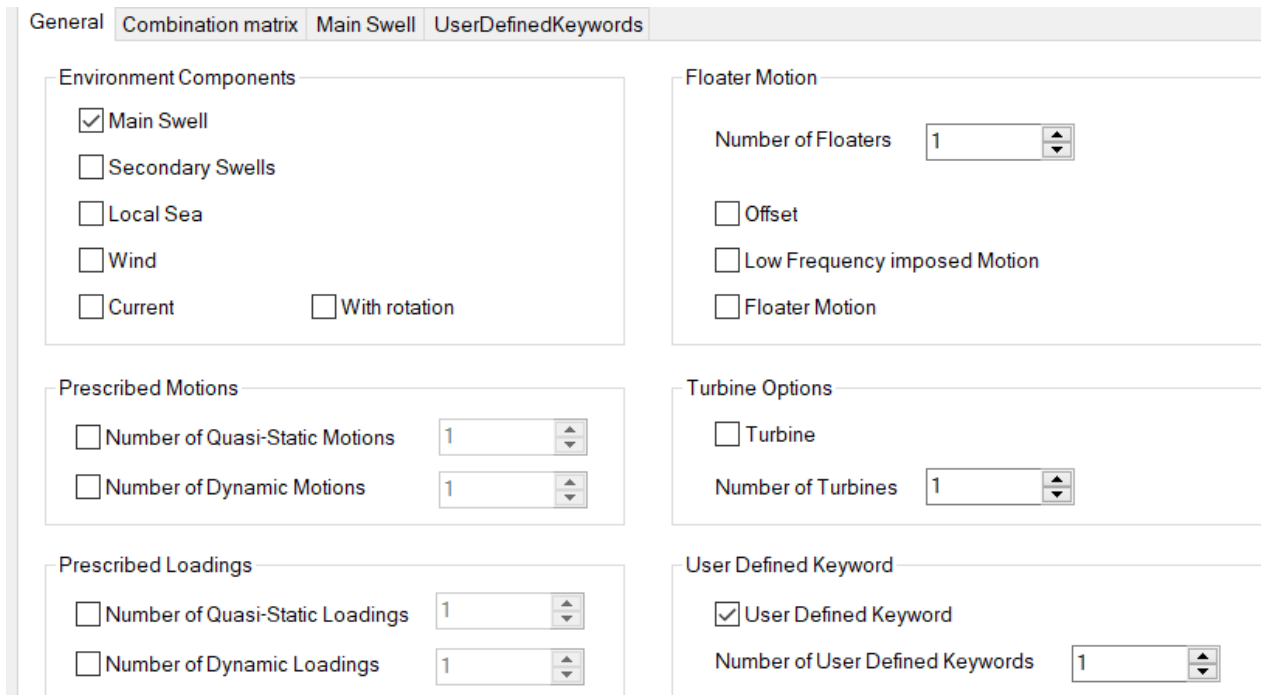
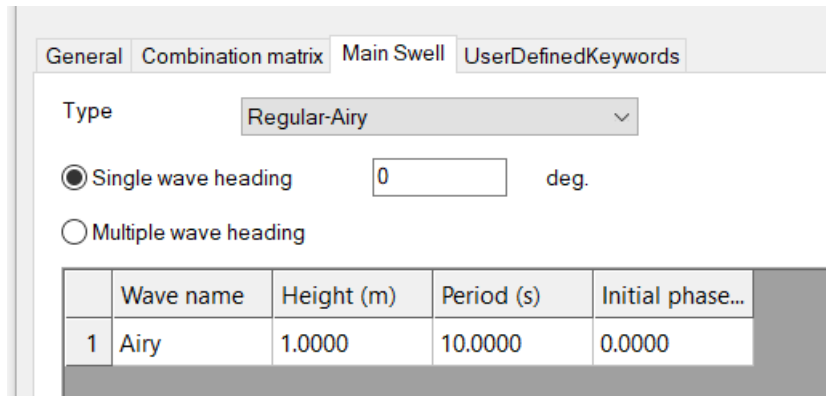


Figure 2-10 : Selection of User Defined Keyword on Environment set

In this example, there is only one main swell defined.

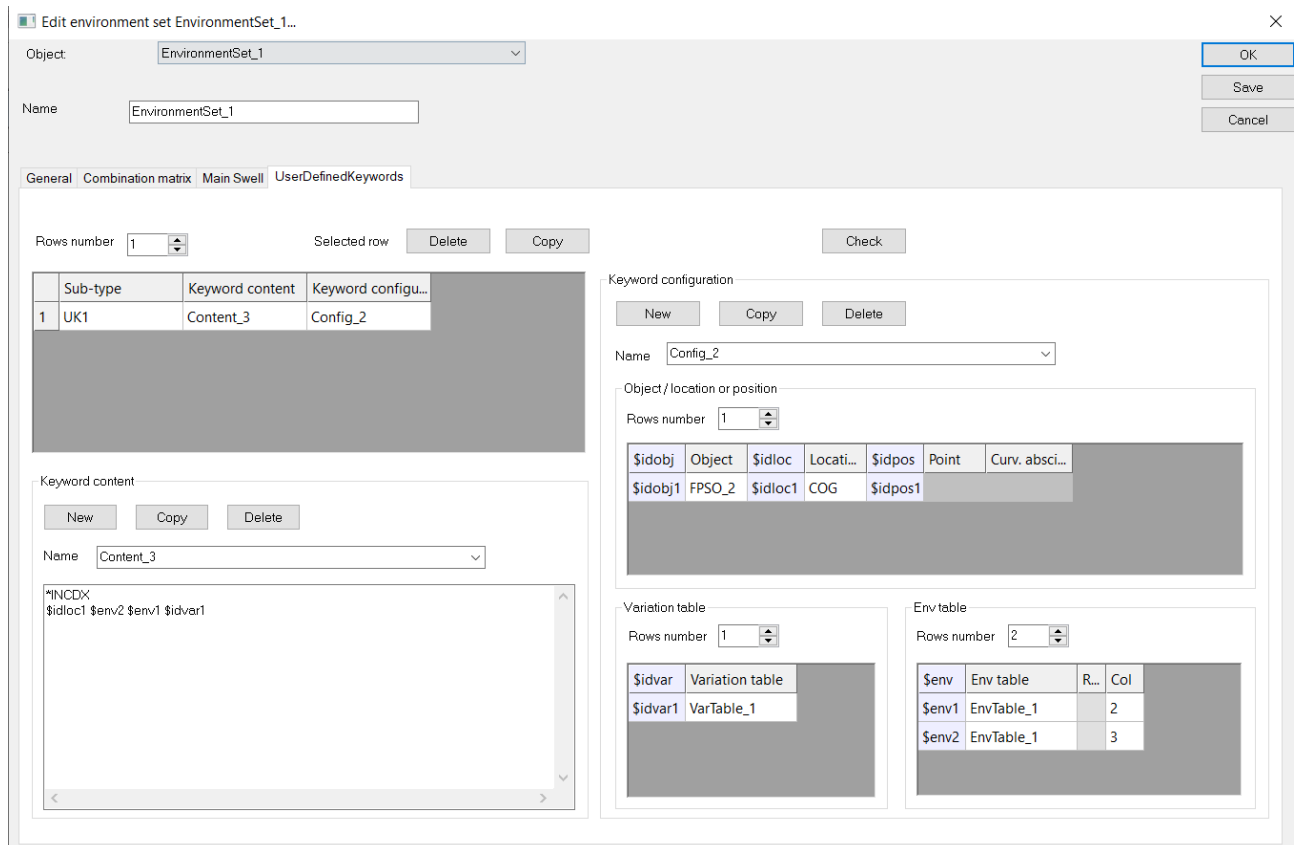


	Wave name	Height (m)	Period (s)	Initial phase...
1	Airy	1.0000	10.0000	0.0000

Figure 2-11 : Selection of main swell in environment set for this example

The User defined keywords sheet looks like the sheet outside of an environment set. Keyword configuration and content outside of the environment set can be used and reciprocally. In this example, existing configuration and content have been used.

The floater FPSO_2 should move by the direction and amplitude specified in the line of EnvTable_1 corresponding to the analysis between step 0 and 5.



Sub-type	Keyword content	Keyword configu...
1	UK1	Content_3

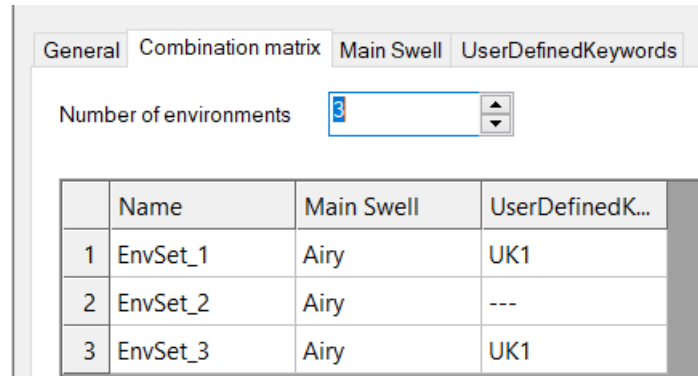
\$idobj	Object	\$idloc	Locati...	\$idpos	Point	Curv. absci...
\$idobj1	FPSO_2	\$idloc1	COG	\$idpos1		

\$env	Env table	R...	Col
\$env1	EnvTable_1		2
\$env2	EnvTable_1		3

Figure 2-12 : Definition of User Defined Keyword in the environment set

The combination matrix is then filled as usual but the line to be used in the environment table is defined in this table in the user defined keyword column. In this case, the floater FPSO_2 will move by 1.2 m in the X direction between step 0 and 5

for the first analysis of the set and will not move for the second analysis and will move by 5 m in the Z direction between step 0 and 5 in the last analysis.



	Name	Main Swell	UserDefinedK...
1	EnvSet_1	Airy	UK1
2	EnvSet_2	Airy	---
3	EnvSet_3	Airy	UK1

Figure 2-13 : Combination matrix used in this example

3 ANALYSES AND ANALYSIS SETS

3.1 BASECASE_SINGLE

This analysis contains UserDefKeyword_1, FPSO_1 and FPSO_2.

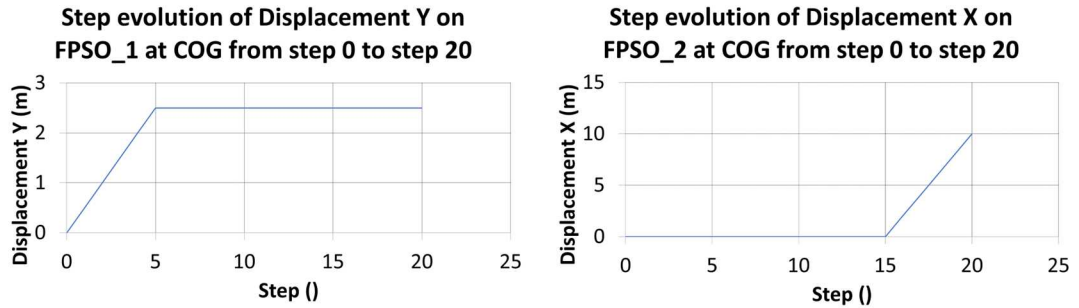


Figure 3-1 : basecase_single results

3.2 WITH_ENV

This analysis contains UserDefKeyword_2, FPSO_1 and FPSO_2.

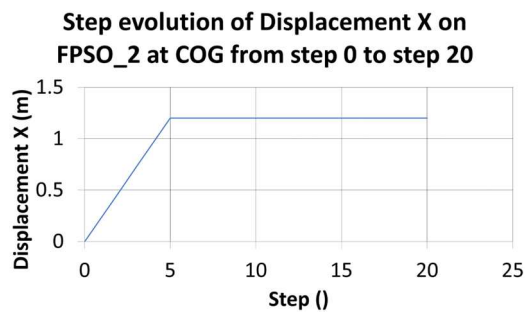


Figure 3-2 : with_env results

3.3 BASECASE_SET

This analysis set contains FPSO_1, FPSO_2 and EnvironmentSet_1. A user defined keyword is defined in this Environment Set.

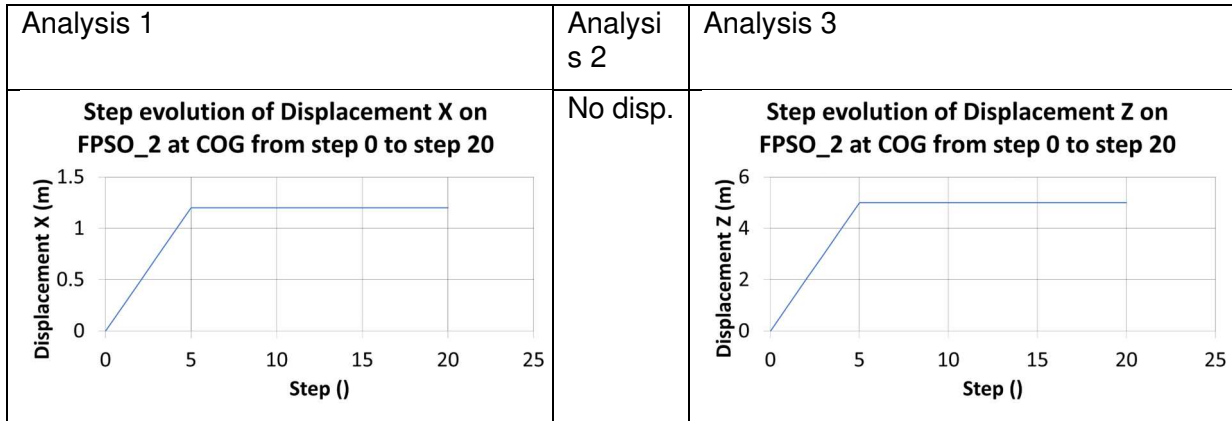


Figure 3-3 : Basecase_set results

3.4 WITH_EXTERNAL_UDK

This case is similar to the previous one, but UserDeKeyword_1 has been added and is used in addition with the user defined keyword defined in the environment set.

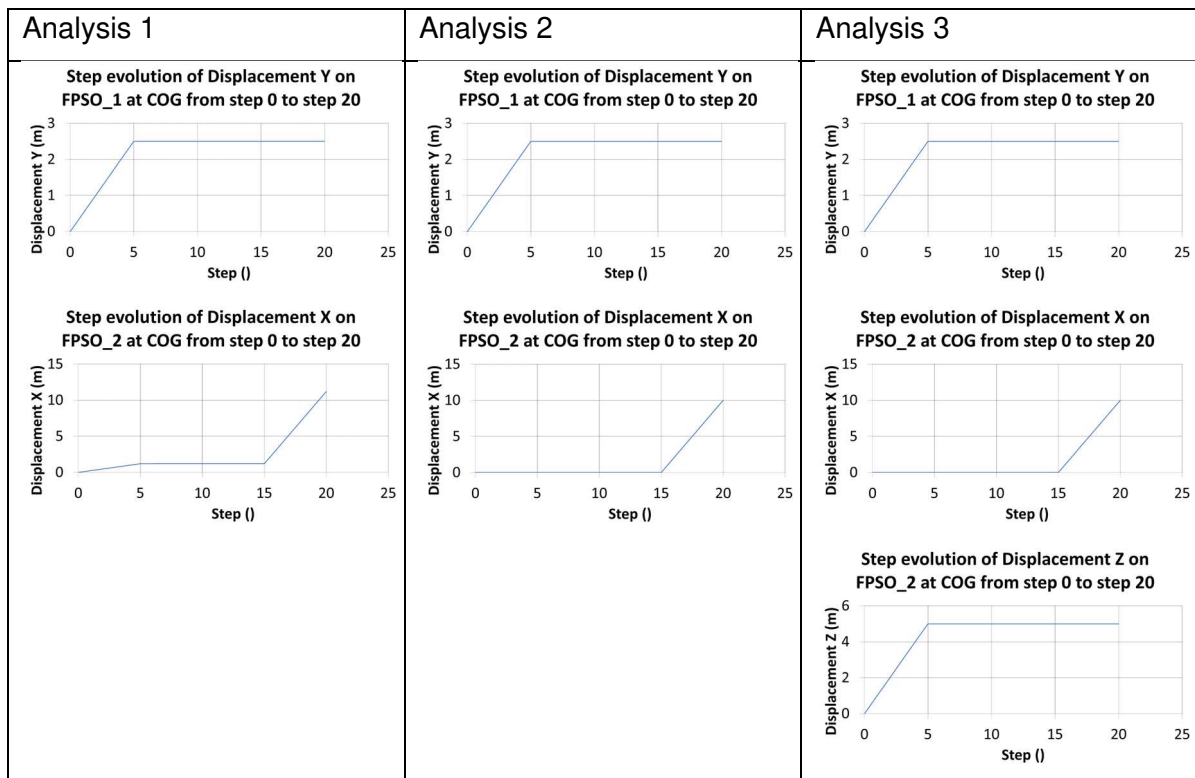


Figure 3-4 : With_external_UDK results