



User's Manual





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Introduction 1

D2P is a simple tool, which is available for free for the users of Usfos. The tool is used to convert nodal displacements to imposed displacements input to USFOS, (prescribed or forced displacements). The tool is found on the web (<u>www.usfos.com</u> under download modules).

D2U is available on Windows, LINUX and MacOSX.

D2U is under development and at present, only beta versions (0.9-X) are available. This document is based on D2P version 0.9, Dec 2013.

2 Running D2P

2.1 From a command shell

The most efficient way to run D2U is from a command shell (DOS or Unix). By just typing *d2p*, the tool starts and asks for the following information:

- File containing Node displacement : (complete file name)
- Output file name

- : (to print the actual data, complete name)
- Prescribed or Forced Disp : ("P" or "F")
- Load Case no : To be used for the generated loads

If "F" is selected, more info is needed. See example in section 3.2.

```
____
____
                D
                    2 P
____
      Displacements to Prescribed Motion -----
____
____
          Version 0.9 / Dec 2013
____
____
                Usfos AS
____
       Converts Nodal displacements to
____
      Usfos input:
____
____
        - NodeDisp
                                      ____
____
                                      ____
          or
____
        - Spring to ground + NodeLoad
                                      ____
____
                                      _____
_____
Give file containing Displacements:
File to write the processed data :
Prescribed or Force+spring
                            ?
Load Case number
                            :
```

Table 2-1 Running D2P from a simple command shell

D2P could also be run from the Usfos GUI (Run Utilities), and the user gives the same input information.



2.2 From USFOS gui.

D2P is found under File/Run Utility/d2p as shown in Figure 2-1. The displacement (text) file name, the output file and actual options are typed into the "standard input" field. In Figure 2-2 the input to option "F" (forced displacements) is shown.

FΓL	ISFOS Graphical User Interface		
File	Edit Display Verify Results Analysis	Window Help	
ê	Open USFOS Result File	Ctrl+O	899
	Open USFOS Model File	Ctrl+Shift+O	
	Open Text File	Ctrl+E	
	New Text File	Ctrl+N	
	Load View Attributes	Ctrl+L	
	Save View Attributes	Ctrl+₩	
	Preferences		
	Run Utility	StruMan	
	Utilities		Soil
	Read Labels From File	Ctrl+B	PeakLoad
	Labels		Fact
	Export to GLview Pro	Ctrl+G	Post DynMax
	Export to Image	Ctrl+M	
	Print	•	mon2stru
	Select Region		SacRed
	1 Z:\tmp\scratch\bug.raf	Waj2Us	
	2 Y:\tmp\scratch\box300_beam_push.raf	vpOne	
	3 Z:\tmp\\usfos\case_06_L_Pos0_pfp.r	CodChk	
	4 Z:\tmp\\usfos\case_05_M_Pos0_pfp.	Fahts	
x	Xit Xact	Alt+F4	JntRes
			PileRes
			d2p

Figure 2-1 – Selecting Run Utility – d2p from USFOS gui.

D 2 P Displacements to Prescribed Motion Version 0, 9 / Dec 2013 Usfos A5 Converts Nodal displacements to Usfos input: - NodeDisp - Spring to ground + NodeLoad Give file containing Displacements:disp.txt File to write the processed data :force.fem Prescribed or Force+spring ?F Load Case number : 10 / Number of Nodes : 5 / Load Case number :: 10 / Statim Z'Nource/UH/AZP/Vest Statim Z'Nource/UH/AZP/Vest Select. - Edtor	Run Utili	ty - d2p.exe			? >
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Number to be added to all IDs :1000 Run Stat in: Z\Source\UNI\d2p\test Editor Input Parameters: Browse Apply Close	Sprin	g Stiffness / 1.0E12/ :			
Run Start in Z'\Source\UtilvU2p\Vest Select Input Parameters: P	Numbe:	r to be added to all IDs :1000			-
Start in Z1\Source\Ubil\d2p\testEditor	Run				
Input Parameters: Run Abort. Standard input Browse Apply Disse	Start in: 2	2:\Source\Util\d2p\test Select			Editor
Parameters: Run Abort Standard input Browse Apply Close	-Input-				
Standard input Browse Apply Close	Parame	eters:		Run	Abort
	Standa	rd input:	Browse	Apply	Close

Figure 2-2 – d2p dialogue from USFOS gui.



2.3 Input parameters

The input parameters are explained in Table 2-2.

Input/option	Comments				
Nodal Displacement	Complete file name to the ASCII (text) file containing the Node-ID + 6 displacement components. Table 2-3 shows the input format. Lines beginning with comment sign are ignored.				
Output file name	Complete file name for result printing. For example: force.fem				
Option, F or P	F:Forced displacements (force+spring)P:Prescribed displacements				
Load Case	Load case number used on the generated loads (NODEDISP or NODELOAD)				
Spring stiffness	For option "F" only: Spring stiffness used together with a concentrated force. The force is set to: F = disp x stiff, (or M = rot x stiff)				
Number to be added to IDs	For option "F" only: D2P will generate sprng2gr element and spring materials. To avoid conflict with the ID's in the FEM model, the user may specify a constant number to be added to all generated IDs.				

Table 2-2 – D2P input parameters and options.

,	Node	x	У	z	rx	ry	rz
	10	0.1	0.2	0.3	0.4	0.5	0.6
	20	1.1	1.2	1.3	1.4	1.5	1.6
	30	2.1	2.2	2.3	2.4	2.5	2.6
	40	3.1	3.2	3.3	3.4	3.5	3.6
	50	4.1	4.2	4.3	4.4	4.5	4.6

Table 2-3 – D2F	[,] input	file.	Node	displacements
-----------------	--------------------	-------	------	---------------



2.4 Output

The output consists of data as shown in the table:

Alternative	Contents of output file
F	 The file contains the following: 1. Heading with key data 2. Per node: a. SPRNG2GR : definitions of 1-node spring elements b. SPRIDIAG : definitions of spring material, (stiffness) c. NODELOAD: forces giving the actual displacements
Р	 The file contains the following: 3. Heading with key data 4. Per node: a. NODEDISP : prescribed displacements

Table 2-4 – D2P output.

For both alternatives, the file "dispfile".usl (f ex disp.txt.usl) containing USFOS labels is generated. The **node**-labels in this label file show where the prescribed or forced displacements are applied.

(Hint: open model file first. Then open the label file to see the actual nodes)

```
BeginLabel
Heading Nodes with special displacement : Force + Spring
NodeLabel 10 F+S
NodeLabel 20 F+S
NodeLabel 30 F+S
NodeLabel 40 F+S
NodeLabel 50 F+S
EndLabel
```





3 Examples

3.1 Prescribed Displacement

Input file	:	disp.txt	(contains 5 nodes)
Load case no	:	2	
Option	:	Р	

The file is "ready-to-use" together with the actual FEM model.

Load case 2 is activated in the USFOS control file (CUSFOS, CICYFOS or DYNAMIC).

```
#
 _____
   Processed Date : 2014-01-02 11:38:12
#
   Displacement file : disp.txt
#
#
    Number of Nodes :
                      5
    Load Case number :
#
                      2
   _____
 Prescribed Nodes
      _____
     LoadCase NodeID DOF_Code <---
                                  Values
                                                        ->
NodeDisp 2 10 123456 1.000E-01 2.000E-01 3.000E-01
                           4.000E-01 5.000E-01 6.000E-01
         2 20 123456 1.100E+00 1.200E+00 1.300E+00
NodeDisp
                           1.400E+00 1.500E+00 1.600E+00
NodeDisp 2 30 123456 2.100E+00 2.200E+00 2.300E+00
                           2.400E+00 2.500E+00 2.600E+00
         2 40 123456 3.100E+00 3.200E+00 3.300E+00
NodeDisp
                           3.400E+00 3.500E+00 3.600E+00
       2 50 123456 4.100E+00 4.200E+00 4.300E+00
NodeDisp
                           4.400E+00 4.500E+00 4.600E+00
   ----- e o f -----
```

Table 3-1 – D2P output if "P" is selected



3.2 Forced Displacements

Input file	:	disp.txt	(contains 5 nodes)
Load case no	:	10	
Option	:	F	
Stiffness	:	10^{12} [N/m]	or [Nm/rad]
Id Add	:	10,000	

The generated IDs are computed as follows: $ID = Node_ID + Id_Add$. In the example, the IDs therefore becomes 10010, 10020, etc for nodes 10, 20 etc.

The file is "ready-to-use" together with the actual FEM model. Load case 10 is activated in the USFOS control file (CUSFOS, CICYFOS or DYNAMIC).

<pre># ====================================</pre>	ssed Date acement file r of Nodes Case number g Stiffness d e d D i s	: 2014- : disp. : 1 : 1 : 1 : p l a c	01-02 12: txt 5 .00 .00E+12 10000 : e m e n	======================================			
Sprng2Gr Sprng2Gr Sprng2Gr Sprng2Gr Sprng2Gr	Elem ID 10010 10020 10030 10040 10050	np1 10 20 30 40 50	material 10010 10020 10030 10040 10050	lcoor	eccl		
SpriDiag SpriDiag SpriDiag SpriDiag SpriDiag	Mat_Id s 10010 1.0 10020 1.0 10030 1.0 10040 1.0 10050 1.0	s11)0E+12)0E+12)0E+12)0E+12)0E+12	s22 1.00E+12 1.00E+12 1.00E+12 1.00E+12 1.00E+12	s33 1.00E+12 1.00E+12 1.00E+12 1.00E+12 1.00E+12	s44 1.00E+12 1.00E+12 1.00E+12 1.00E+12 1.00E+12	s55 1.00E+12 1.00E+12 1.00E+12 1.00E+12 1.00E+12	s66 1.00E+12 1.00E+12 1.00E+12 1.00E+12 1.00E+12
' NodeLoad	Load Case 10	Node ID 10) L 1.0000 4.0000	0 A D 0E+11 0E+11	I N T E N S 2.00000E+11 5.00000E+11	I T Y 3.0000 6.0000	0E+11 0E+11
NodeLoad	10	20	1.1000 1.4000	0E+12 0E+12	1.20000E+12 1.50000E+12	1.3000 1.6000	0E+12 0E+12
NodeLoad	10	30	2.1000 2.4000	0E+12 0E+12	2.20000E+12 2.50000E+12	2.3000 2.6000	0E+12 0E+12
NodeLoad	10	40	3.1000 3.4000	0E+12 0E+12	3.20000E+12 3.50000E+12	3.3000 3.6000	0E+12 0E+12
NodeLoad	10	50	4.1000 4.4000	0E+12 0E+12	4.20000E+12 4.50000E+12	4.3000 4.6000	0E+12 0E+12

Table 3-2 – D2P output if "F" is selected.



4 Limitations and Hints

The maximum number of nodes with displacements is set to 10,000.

Prescribed displacements (NODEDISP) require substantial memory, (proportional with the model size and number of prescribed nodes). The "Forced displacement" option is therefore recommended in most cases.

The default stiffness (F option) is set to 10^{12} , and this ensures that the applied force will give the actual displacement, (i.e. the node displacement from the normal loads is ~zero). Check the impact from the stiffness by comparing the results with different stiffness.