

The logo for SVS FEM features the text "SVS FEM" in a bold, black, sans-serif font. The text is positioned on a yellow rectangular background. Below the yellow background is a thick black horizontal line.

**SVS FEM**

## **Export Displacement History ACT**

**Your partner in computing**

# Description

## Modul: Mechanical

The ACT extension provides transfer of Initial State of selected bodies into following a global model. It allows to easily include complex material-contact-geometrical behaviour springs, clamps, ... in pretended state in the global model. It could by way how to pre-solve initial state (stress-strain) of a model part which corresponds to a complex manufacturing process.

### Background:

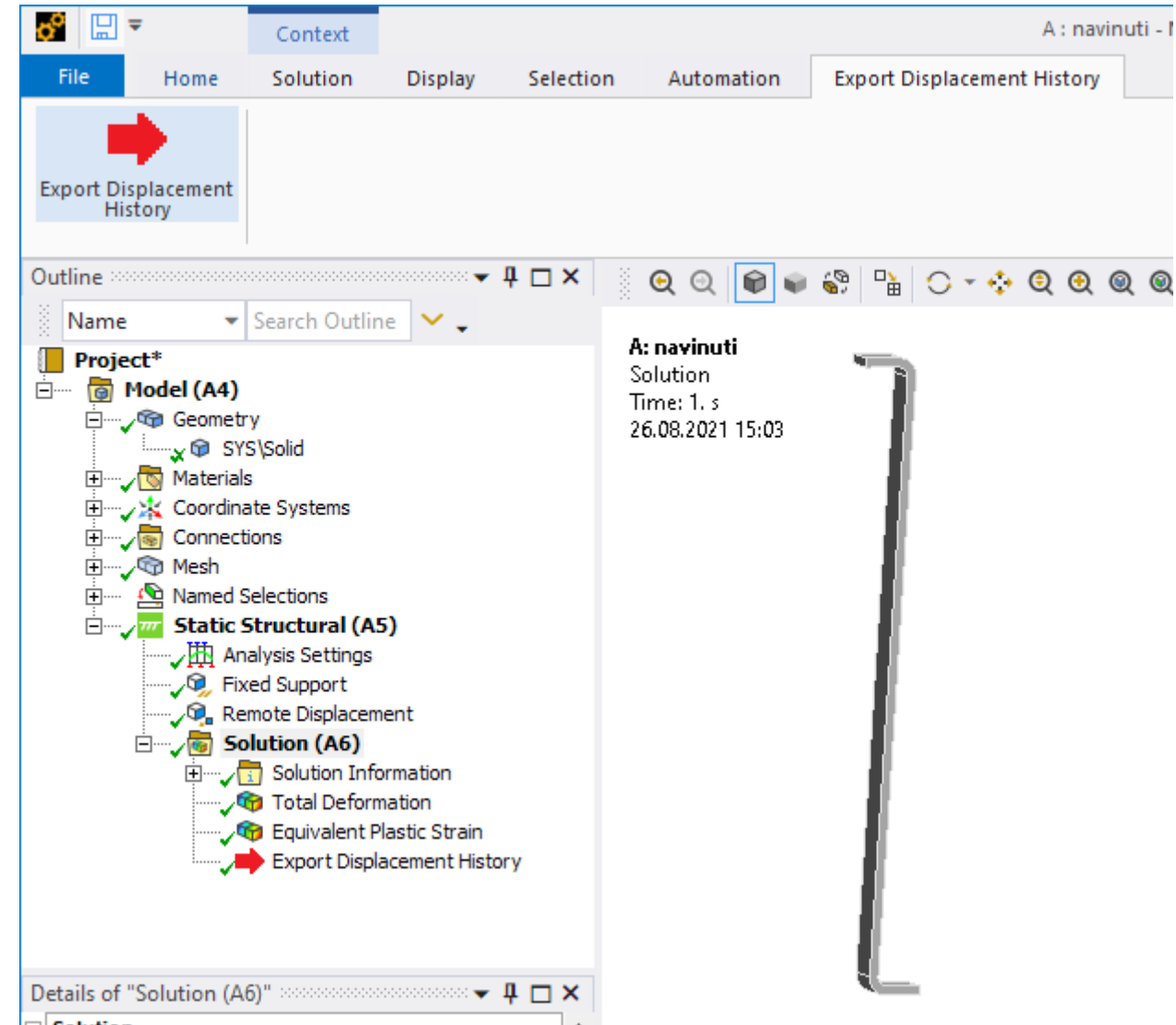
The ACT exports ASCII file with APDL curves (tables) of each node over whole solved time history. The curves can be used such as part of APDL input for next analysis in Mechanical or Mechanical APDL module.



# Workflow

1. Adding of “Export Displacement History” object into sub-model.
2. Selecting of Named Selection name.
3. Evaluating of the displacement file.

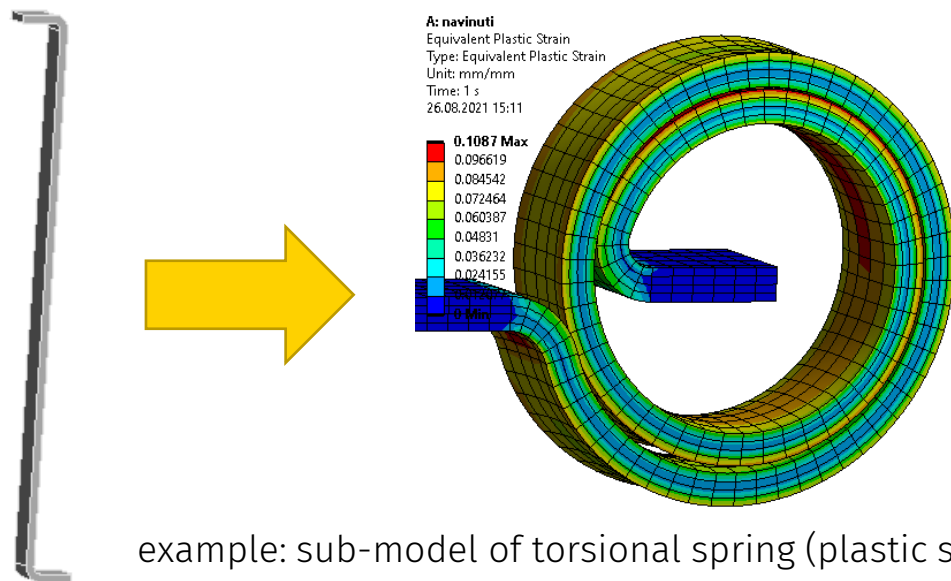
Details of "Export Displacement History"	
<b>Displacement History</b>	
Named Selection	all
Target Folder	user_files
File Name	disp.inp
Overwrite Existing File	Yes
Time Steps	All (solved)
Node Definition	By Location
Degrees of Freedom	UX-UY-UZ
<b>Export Mesh</b>	
Format	CDB
Perform Export	Yes
Named Selection	all
Target Folder	user_files
File Name	disp.cdb
Overwrite Existing File	Yes
<b>Symmetric Expansion</b>	
Coordinate System	Global Coordinate System
X-direction	No
Y-direction	No
Z-direction	No
<b>Units</b>	
Length	m
Time	sec





# Exported File

## 1. APDL tables for each node



```
1 /nopr
2 /com,
3 /com, act: Export Displacement History (SVS FEM s.r.o., Zdenek Cada, February 2021)
4 /com, displacement [m] curves in time [sec]
5
6 /com, EXPANSION DIRECTION : pXpYpZ
7
8 *dim,edh_ux_1_pXpYpZ, TABLE, 218,,, TIME
9 edh_ux_1_pXpYpZ(1,0) = 0.002 $ edh_ux_1_pXpYpZ(1,1) = -0.00253661274909973
10 edh_ux_1_pXpYpZ(2,0) = 0.004 $ edh_ux_1_pXpYpZ(2,1) = -0.00508154678344727
11 edh_ux_1_pXpYpZ(3,0) = 0.007 $ edh_ux_1_pXpYpZ(3,1) = -0.00891296672821045
12 edh_ux_1_pXpYpZ(4,0) = 0.01 $ edh_ux_1_pXpYpZ(4,1) = -0.012759693145752
13 edh_ux_1_pXpYpZ(5,0) = 0.0145 $ edh_ux_1_pXpYpZ(5,1) = -0.0185508441925049
14 edh_ux_1_pXpYpZ(6,0) = 0.019 $ edh_ux_1_pXpYpZ(6,1) = -0.024355525970459
15 edh_ux_1_pXpYpZ(7,0) = 0.0235 $ edh_ux_1_pXpYpZ(7,1) = -0.0301692581176758
16 edh_ux_1_pXpYpZ(8,0) = 0.03025 $ edh_ux_1_pXpYpZ(8,1) = -0.038880989074707
17 edh_ux_1_pXpYpZ(9,0) = 0.0326125 $ edh_ux_1_pXpYpZ(9,1) = -0.0419213027954102
18 edh_ux_1_pXpYpZ(10,0) = 0.034975 $ edh_ux_1_pXpYpZ(10,1) = -0.044957145690918
19 edh_ux_1_pXpYpZ(11,0) = 0.03851875 $ edh_ux_1_pXpYpZ(11,1) = -0.0494972648620605
20 edh_ux_1_pXpYpZ(12,0) = 0.0420625 $ edh_ux_1_pXpYpZ(12,1) = -0.0540013046264648
21 edh_ux_1_pXpYpZ(13,0) = 0.04560625 $ edh_ux_1_pXpYpZ(13,1) = -0.0584850921630859
22 edh_ux_1_pXpYpZ(14,0) = 0.050921875 $ edh_ux_1_pXpYpZ(14,1) = -0.0651442337036133
23 edh_ux_1_pXpYpZ(15,0) = 0.0535796875 $ edh_ux_1_pXpYpZ(15,1) = -0.0683672866821289
24 edh_ux_1_pXpYpZ(16,0) = 0.0562375 $ edh_ux_1_pXpYpZ(16,1) = -0.0717033233642578
25 edh_ux_1_pXpYpZ(17,0) = 0.06022421875 $ edh_ux_1_pXpYpZ(17,1) = -0.0765799942016602
26 edh_ux_1_pXpYpZ(18,0) = 0.0642109375 $ edh_ux_1_pXpYpZ(18,1) = -0.0814274826049805
27 edh_ux_1_pXpYpZ(19,0) = 0.070191015625 $ edh_ux_1_pXpYpZ(19,1) = -0.0884155197143555
28 edh_ux_1_pXpYpZ(20,0) = 0.07617109375 $ edh_ux_1_pXpYpZ(20,1) = -0.0954204940795898
29 edh_ux_1_pXpYpZ(21,0) = 0.082151171875 $ edh_ux_1_pXpYpZ(21,1) = -0.102027153015137
30 edh_ux_1_pXpYpZ(22,0) = 0.08813125 $ edh_ux_1_pXpYpZ(22,1) = -0.10842455291748
31 edh_ux_1_pXpYpZ(23,0) = 0.09261630859375 $ edh_ux_1_pXpYpZ(23,1) = -0.113148750305176
32 edh_ux_1_pXpYpZ(24,0) = 0.0971013671875 $ edh_ux_1_pXpYpZ(24,1) = -0.117612930297852
33 edh_ux_1_pXpYpZ(25,0) = 0.10158642578125 $ edh_ux_1_pXpYpZ(25,1) = -0.122031623840332
34 edh_ux_1_pXpYpZ(26,0) = 0.106071484375 $ edh_ux_1_pXpYpZ(26,1) = -0.126226097106934
35 edh_ux_1_pXpYpZ(27,0) = 0.11055654296875 $ edh_ux_1_pXpYpZ(27,1) = -0.130366836547852
36 edh_ux_1_pXpYpZ(28,0) = 0.117284130859375 $ edh_ux_1_pXpYpZ(28,1) = -0.136053604125977
   _1_pXpYpZ(29,0) = 0.119806976318359 $ edh_ux_1_pXpYpZ(29,1) = -0.138067047119141
   _1_pXpYpZ(30,0) = 0.122329821777344 $ edh_ux_1_pXpYpZ(30,1) = -0.140114349365234
   _1_pXpYpZ(31,0) = 0.12611408996582 $ edh_ux_1_pXpYpZ(31,1) = -0.14302262878418
   _1_pXpYpZ(32,0) = 0.129898358154297 $ edh_ux_1_pXpYpZ(32,1) = -0.14581266784668
```

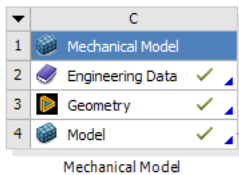
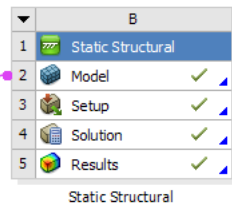
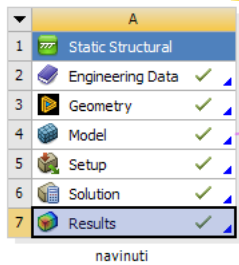
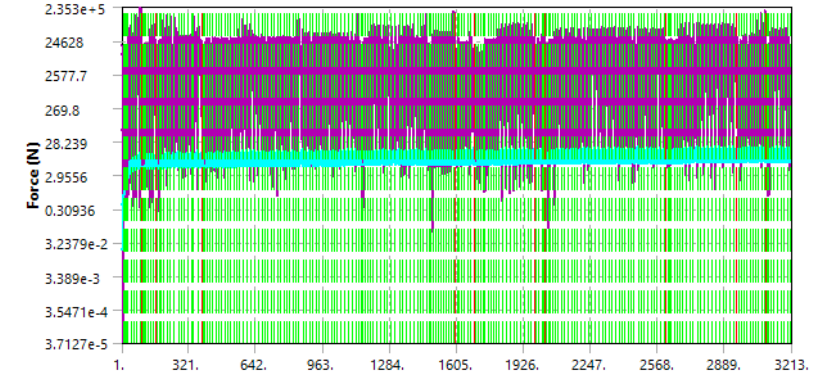
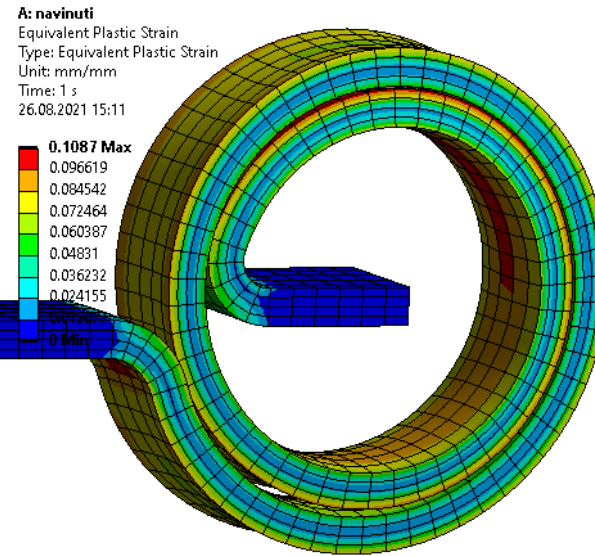
pruzina_files > user_files		Search user_files		
Name	Date modified	Type	Size	
disp.cdb	25.08.2021 8:34	CDB File	1 931 KB	
disps.inp	25.08.2021 8:34	INP File	815 743 KB	



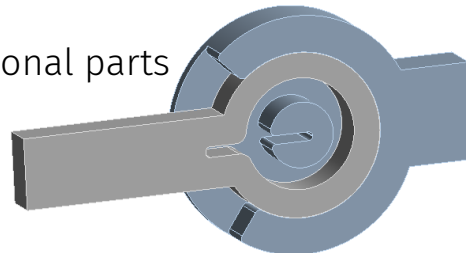
# Example of workflow

1. Sub-model
2. Global model

sub-model: 3213 iteration (manufacturing process)



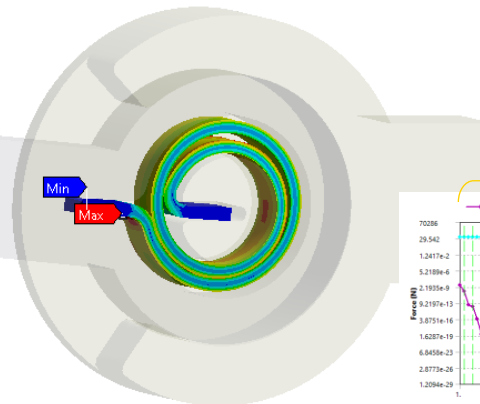
additional parts



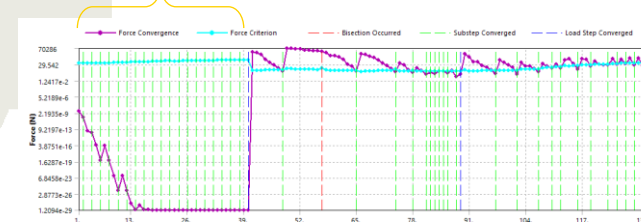
**B: Static Structural**  
Equivalent Plastic Strain  
Type: Equivalent Plastic Strain  
Unit: mm/mm  
Time: 3 s  
26.08.2021 15:16

0.11849 Max  
0.10532  
0.092159  
0.078994  
0.065828  
0.052662  
0.039497  
0.026331  
0.013166  
0 Min

global model: torsional spring + additional parts



manufacturing process

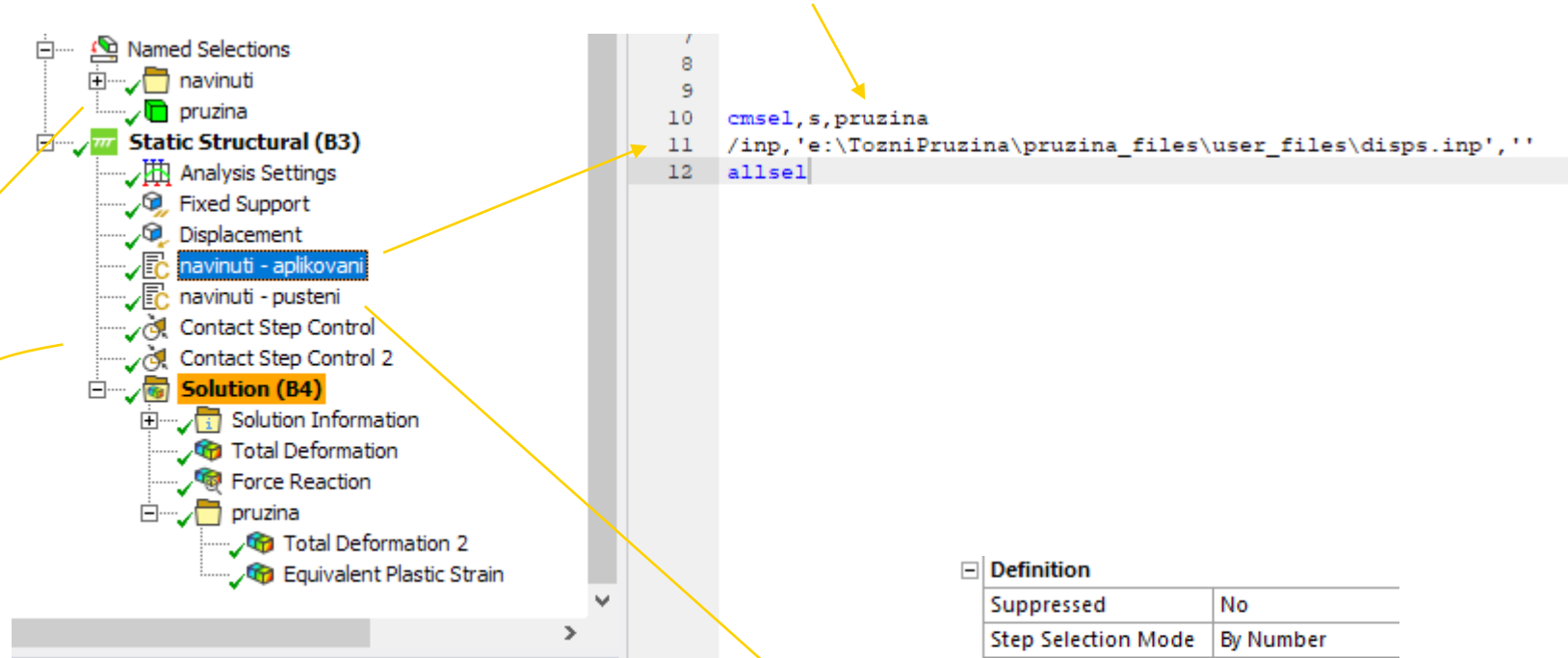
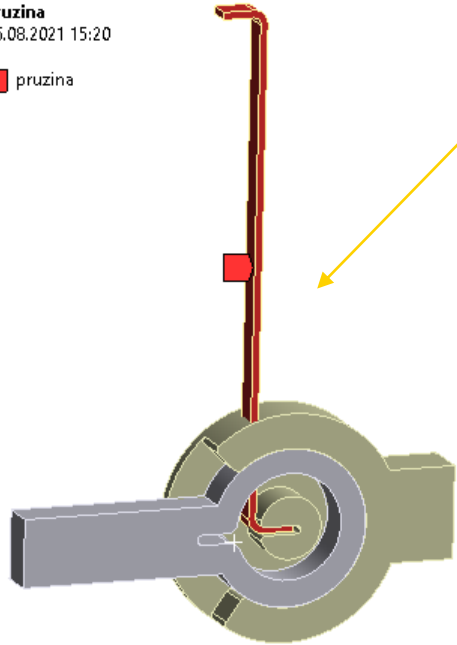


# Applying of Displacement in Global Model

1. Simple reference to "disp.inp" file
2. Deleting of boundary condition in second step
3. Activating of contacts

pruzina  
26.08.2021 15:20

pruzina



Definition	
Suppressed	No
Step Selection Mode	By Number
Step Number	2.
Target	Mechanical APDL
Issue Solve Command	Yes

Details of "Contact Step Control"	
Scope	
Scoping Method	Contact Region
Contact Region	Frictional - vnitrni
Definition	
ID (Beta)	123
Type	Contact Step Control
Normal Stiffness	From Contact Region
Suppressed	No
Step Controls	
Current Step	2
Status	Alive

8	
9	cmsel,s,pruzina
10	nsle
11	ddele,all,all,,,1
12	allsel

**Thank you for using  
SVS FEM ACTs**

**SVS FEM**

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