

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Kesimpulan yang didapatkan oleh peneliti dalam penelitian ini adalah sebagai berikut:

- a. Diperoleh 2 unit *Grip* untuk *Shaft* bagian atas dan *Shaft* bagian bawah sebagai alat bantu untuk pengujian tarik di mesin uji tarik Lab. Pengetahuan Bahan FTI UAJY.
- b. Hasil uji performansi menunjukkan bahwa *Grip* yang dibuat telah mampu membantu proses pengujian tarik pada mesin uji tarik untuk pengujian spesimen *Eva Rubber* dengan kekerasan 30-40 dan mengetahui tegangan maksimal adalah 12,9428 N/cm², lalu gaya tarik maksimal adalah 26 Kgf.

6.2. Saran

Desain rancangan *Grip* ini mampu melakukan uji tarik pada spesimen *Rubber*, berikut adalah saran dari penulis setelah melakukan penelitian ini:

- a. *Grip* dapat mencengkam dengan baik spesimen rubber dengan dimensi sesuai ASTM, namun perlu adanya penelitian lebih lanjut untuk mengetahui apakah spesimen selain *Rubber* dapat diuji menggunakan *Grip* ini dan mesin uji tarik di lab. Pengetahuan bahan.
- b. Pada saat pengencangan cekam grip, tingkat kekencangan diusahakan jangan terlalu kuat ataupun terlalu lemah, hal ini disebabkan tools yang belum tersedia fitur parameter kekuatan cengkram pada spesimen.

DAFTAR PUSTAKA

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LAMPIRAN

Lampiran 1 Hasil Analisa Ujung *Shaft* dengan *Inventor 3D*

Stress Analysis Report

file:///G:/ugi/pin.html

Stress Analysis Report

Analyzed File:	Assembly shaft atas.lam
Autodesk Inventor Version:	2012 (Build 160160000, 160)
Creation Date:	06/10/2015, 23:05
Simulation Author:	Patris42
Summary:	

Project Info (iProperties)

Summary

Author: Patris42

Project

Designer:	Patris42
Cost:	Rp0
Date Created:	06/10/2015

Status

Design Status: WorkInProgress

Custom

Translation Standard:	STEP AP214IS
FileName:	D:\DEDY\Assembly shaft atas.stp
PreProcessor:	Autodesk Inventor 2010
PostProcessor:	Build: 160, Release: 2012 RTM - Date: Tue 03/01/2011

Stress Analysis Report

file:///G:/ugi/pin.html

PostProcessor:	Build: 160, Release: 2012 RTM - Date: Tue 03/01/2011
Sent Units:	millimeter
Uncertainty:	0,01

Physical

Mass:	0,397338 kg
Area:	111873 mm ²
Volume:	397338 mm ³
Center of Gravity:	x=29,0134 mm y=41,1924 mm z=18,3456 mm

Note: Physical values could be different from Physical values used by FEA reported below.

Simulation:1

General objective and settings:

Design Objective:	Single Point
Simulation Type:	Static Analysis
Last Modification Date:	06/10/2015, 23:04
Detect and Eliminate Rigid Body Modes:	No
Separate Stresses Across Contact Surfaces:	No
Motion Loads Analysis:	No

Advanced settings:

Avg. Element Size (fraction of model diameter):	0,1
Min. Element Size (fraction of avg. size):	0,2
Grading Factor:	1,3
Max. Turn Angle:	60 deg
Create Curved Mesh Elements:	No
Use part based measure for Assembly mesh:	Yes

Material(s)

Name:	Steel, Mild
Mass Density:	7,86 g/cm ³

Stress Analysis Report

file:///G:/ugi/pin.html

Name:	Steel, Mild	7,86 g/cm ³
General:	Yield Strength:	207 MPa
	Ultimate Tensile Strength:	345 MPa
	Young's Modulus:	220 GPa
Stress:	Poisson's Ratio:	0,275
	Shear Modulus:	81 GPa
Stress Thermal:	Expansion Coefficient:	0,00012 1/c
	Thermal Conductivity:	50 W/(m c)
	Specific Heat:	480 J/(kg c)
Part(s):	Part1	
	Part2	
	Part3	
	Part4	
	Part5	
	Part6	
	Part7	
	Part8	
	Part9	
	Part10	
Part Name(s):	Part1	
	Part2	
	Part3	
	Part4	
	Part5	
	Part6	
	Part7	
	Part8	
	Part9	
	Part10	
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	Part99	
	Part100	

Operating conditions

Force1

Load Type: Force

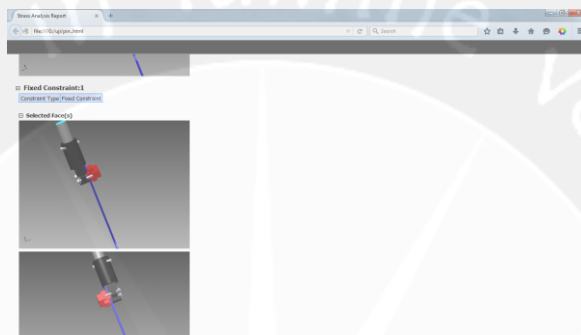
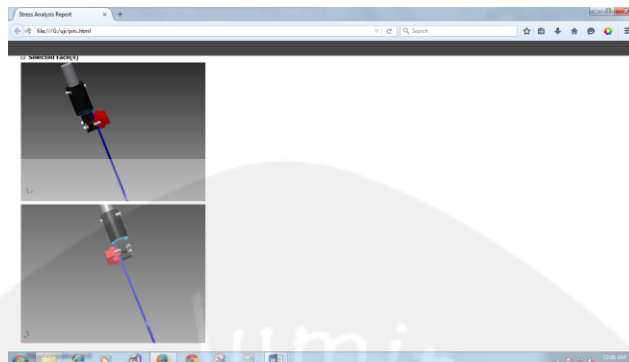
Mag: 1000 N

Vector X: 0,000 N

Vector Y: 0,000 N

Vector Z: -1000,000 N

Selected face(s)



Results

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
Fixed Constraint:1	5883,99 N	0 N 0 N 5883,99 N	0,0736099 N m	0 N m -0,0736099 N m 0 N m

Result Summary

Name	Minimum	Maximum
Volume	397338 mm ³	
Mass	3,12308 kg	
Von Mises Stress	0,0000113404 MPa	10,2752 MPa
1st Principal Stress	-0,765476 MPa	11,7062 MPa
3rd Principal Stress	-3,11494 MPa	3,08957 MPa
Displacement	0 mm	0,00496439 mm
Safety Factor	15 ul	15 ul
Stress XX	-2,01152 MPa	4,06886 MPa
Stress XY	-0,816343 MPa	0,728181 MPa
Stress XZ	-2,53768 MPa	2,27306 MPa
Stress YY	-2,19208 MPa	4,06886 MPa
Stress YZ	-2,60984 MPa	1,97952 MPa
Stress ZZ	-2,09978 MPa	10,8164 MPa
X Displacement	-0,00016012 mm	0,00364734 mm
Y Displacement	-0,000159418 mm	0,000173201 mm
Z Displacement	-0,00373045 mm	0 mm
Equivalent Strain	0,000000000440276 ul	0,0000417372 ul
1st Principal Strain	-0,000000334727 ul	0,0000487227 ul

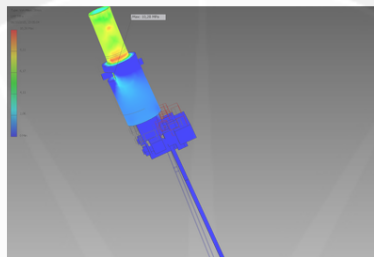
Stress Analysis Report x +

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X Displacement	-0,00016012 mm	0,00364734 mm
Y Displacement	-0,000159418 mm	0,000173201 mm
Z Displacement	-0,00373045 mm	0 mm
Equivalent Strain	0,000000000440276 ul	0,0000417372 ul
1st Principal Strain	-0,00000334727 ul	0,0000487227 ul
3rd Principal Strain	-0,0000139098 ul	0,0000000519159 ul
Strain XX	-0,0000116761 ul	0,00000429368 ul
Strain XY	-0,00000473108 ul	0,00000422014 ul
Strain XZ	-0,000014707 ul	0,0000131734 ul
Strain YY	-0,0000125321 ul	0,00000353948 ul
Strain YZ	-0,0000151252 ul	0,0000114722 ul
Strain ZZ	-0,00000745075 ul	0,0000454424 ul
Contact Pressure	0 MPa	13,6971 MPa
Contact Pressure X	-4,27218 MPa	4,01589 MPa
Contact Pressure Y	-7,02055 MPa	6,66365 MPa
Contact Pressure Z	-11,4151 MPa	8,51854 MPa

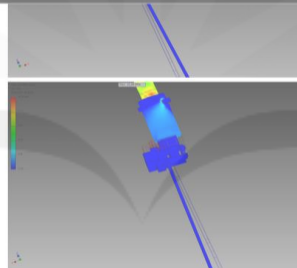
Figures

Von Mises Stress

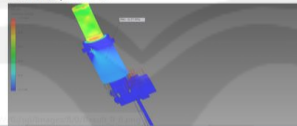


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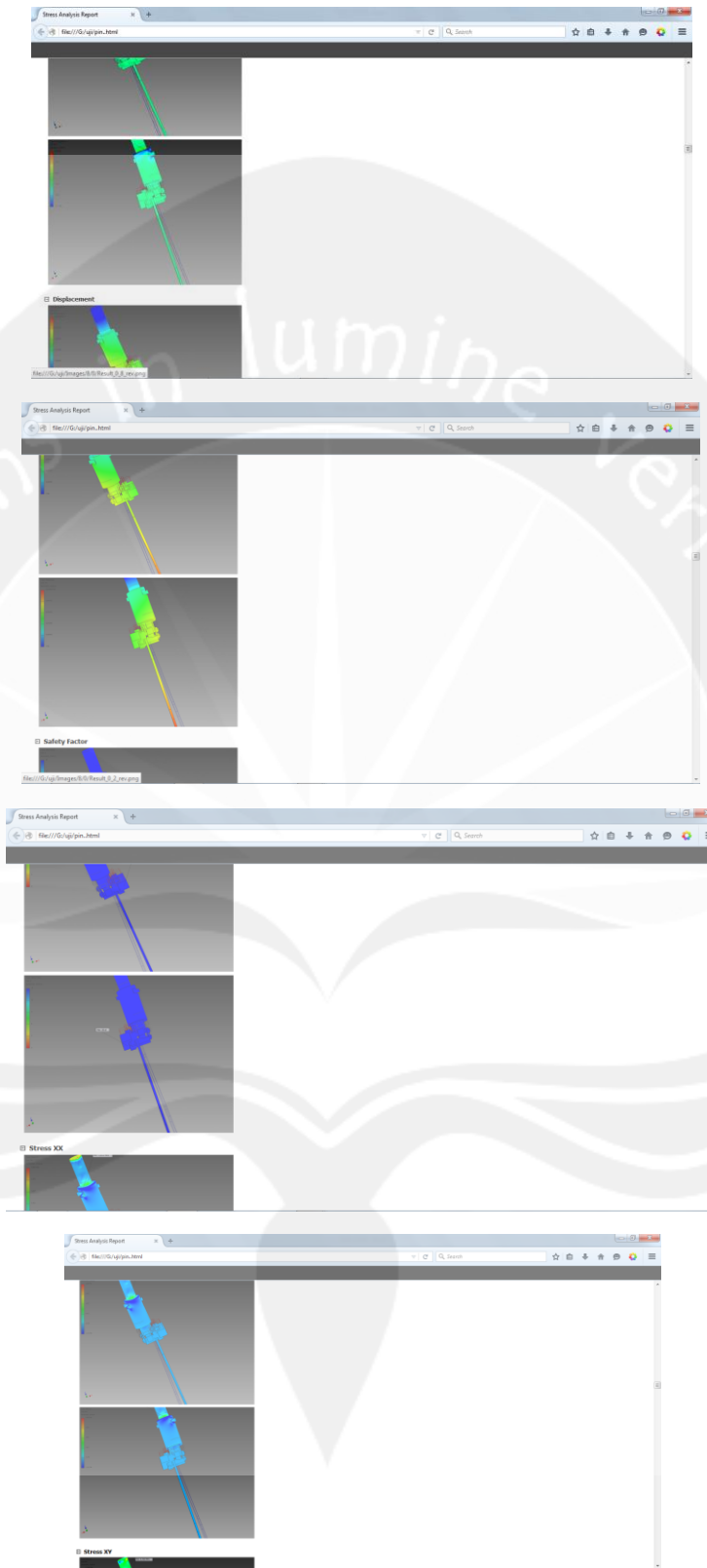
1st Principal Stress



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file:///G:/uji/pin.html

3rd Principal Stress



Lampiran 2 Hasil Analisis Grip dengan Inventor 3D

Stress Analysis Report

Autodesk®

Analyzed File: Assembly shaft.stu.asm
 Autodesk Inventor Version: 2012 (Build 160160000, 160)
 Creation Date: 06/10/2015, 23:01
 Simulation Author: Pains42
 Summary:

Project Info (Properties)

Summary
 Author: Pains42

Project
 Designer: Pains42
 Case: Grip
 Book Created: 06/10/2015

Status
 Design Status: WorkInProgress

Custom

Translation Standard	STEP AP214:15
File Name	D:\0501\Assembly shaft.stu.ajp
PostProcessor	Autodesk Inventor 2012
PostProcessor	Build: 160, Release: 2012 RTM - Date: Tue 03/01/2011
Unit System	millimeter
Uncertainty	0.01

Status
 Design Status: WorkInProgress

Custom

Translation Standard	STEP AP214:15
File Name	D:\0501\Assembly shaft.stu.ajp
PostProcessor	Autodesk Inventor 2012
PostProcessor	Build: 160, Release: 2012 RTM - Date: Tue 03/01/2011
Unit System	millimeter
Uncertainty	0.01

Physical

Mass	6.397238 kg
Area	111673 mm ²
Volume	397238 mm ³
Center of Gravity	x=24.014 mm y=41.194 mm z=18.816 mm

Note: Physical values could be different from Physical values used by FEA reported below.

Simulation:1

General objective and settings:

Design Objective	Single Point
Simulation Type	Static Analysis
Last Modification Date	06/10/2015, 23:01
Default and Eliminate Rigid Body Modes	No
Support: Stresses Across Contact Surfaces	No
Motion Loads Analysis	No

Advanced settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2

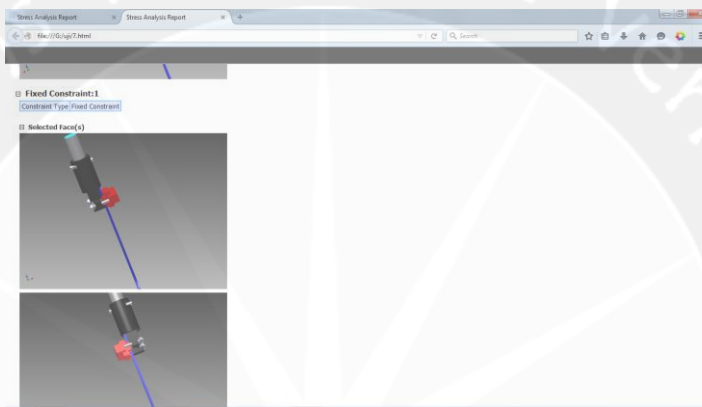
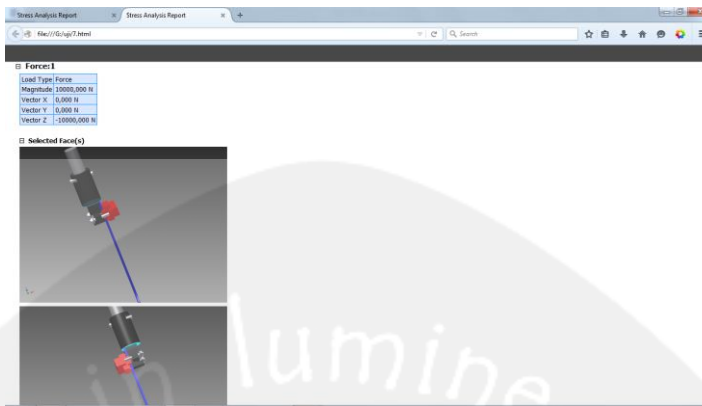
Advanced settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2
Grading Factor	1.5
Max. T-Turn Angle	60 deg
Create Coned Mesh Elements	No
Use part-based measure for Assembly mesh	Yes

Material(s)

Name	Steel, MS
General	Mass Density: 7.85 g/cm ³
	Yield Strength: 207 MPa
	Ultimate Tensile Strength: 343 MPa
	Henry's Modulus: 220 GPa
Stress	Poisson's Ratio: 0.279
	Shear Modulus: 8 GPa
	Expansion Coefficient: 0.00012 1/K
Stress Thermal	Thermal Conductivity: 58 W/(m K)
	Specific heat: 480 J/(kg C)
Part	Part2
	Part1_part12
	Part1_1
	Part1_2
	Part1_3
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	Part1_100

General conditions



Results

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
Fixed Constraint 1	10000 N	0 N 0 N -10000 N	0 N m 0 N m -1.125109 N m	0 N m 0 N m 0 N m

Result Summary

Name	Minimum	Maximum
Volume	297128 mm ³	
Mass	3.12500 kg	
Von Mises Stress	0.0000000000000000 MPa	17.463 MPa
1st Principal Stress	-1.30683 MPa	16.981 MPa
2nd Principal Stress	-0.26883 MPa	0.2064 MPa
Displacement	0 mm	0.0084371 mm
Safety Factor	11.8536	17.4
Stress XX	-0.41803 MPa	0.82513 MPa
Stress XY	-1.3874 MPa	1.22756 MPa
Stress XZ	-4.31263 MPa	1.80313 MPa
Stress YY	-0.7220 MPa	0.61213 MPa
Stress YZ	-4.4326 MPa	1.36426 MPa
Stress ZZ	-0.36883 MPa	0.13817 MPa
X Displacement	-0.00027128 mm	0.00249875 mm
Y Displacement	-0.00027036 mm	0.00249875 mm
Z Displacement	-0.00058 mm	0 mm
Equivalent Strain	0.0000000000000000	0.0000790136
1st Principal Strain	-0.0000000000000000	0.0000000000000000
2nd Principal Strain	-0.000016461	0.0000000000000000
3rd Principal Strain	-0.000016461	0.0000000000000000

