

LAMPIRAN A
CONTOH PERHITUNGAN

Lampiran A. Contoh Perhitungan

A.1 Perhitungan Indeks Ketidakhomogenan

$$SII = \frac{(Max \varepsilon_p - Min \varepsilon_p)}{Avg \varepsilon_p}$$

a) Sudut *Channel* 90

$$SII = \frac{(0,98813 - 0,041889)}{0,29882} = 3,166591928$$

b) Sudut *Channel* 105

$$SII = \frac{(0,78708 - 0,065163)}{0,28549} = 2,528694525$$

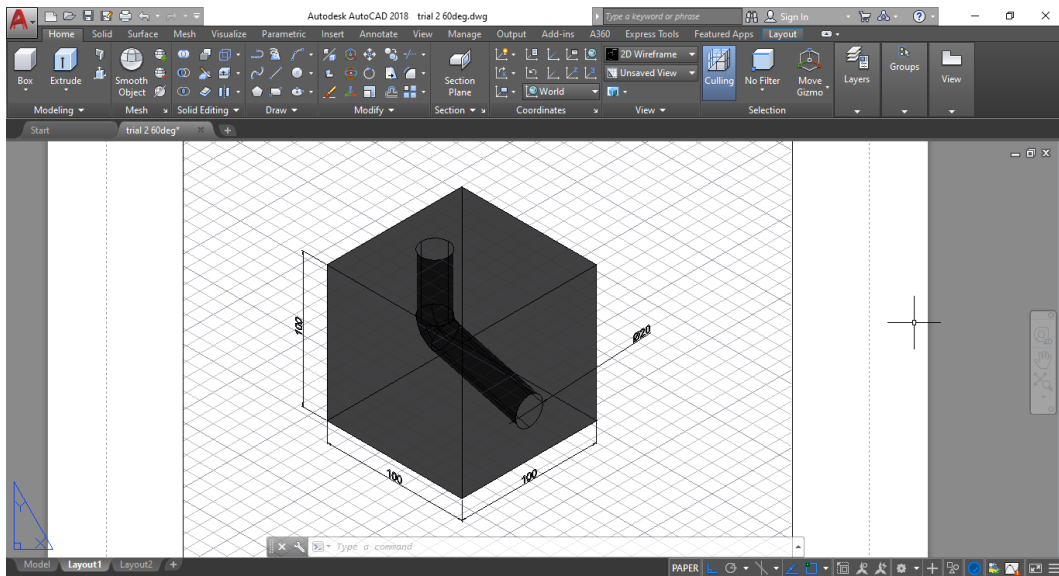
c) Sudut *Channel* 120

$$SII = \frac{(0,63495 - 0,062426)}{0,25351} = 2,258388229$$

LAMPIRAN B
GAMBAR METODE PENELITIAN

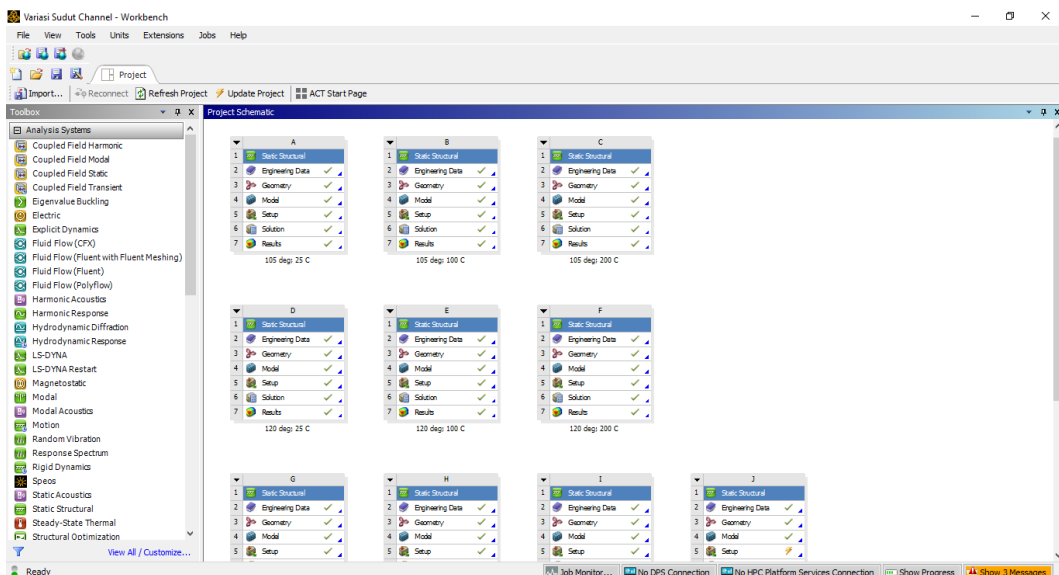
Lampiran B. Gambar Metode Penelitian

B.1 Pembuatan Geometri dengan AutoCAD

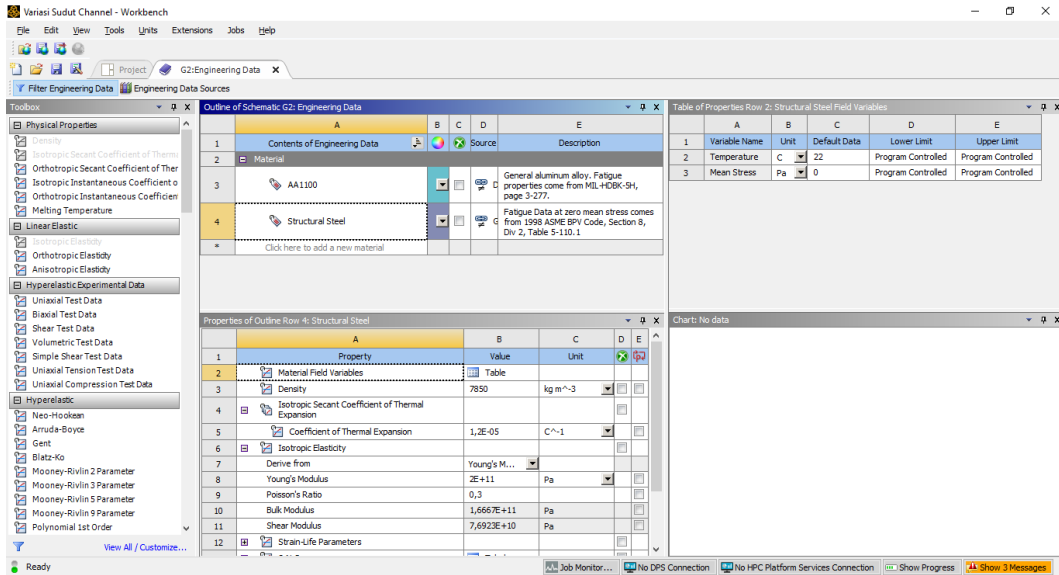


Gambar B.1 Pembuatan Geometri 3D *Die* dan Sampel

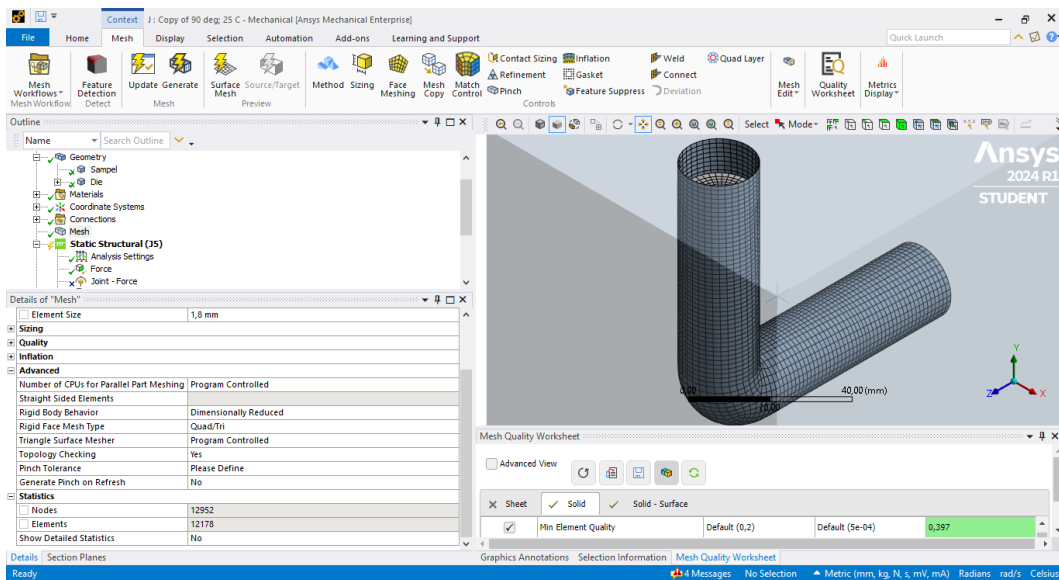
B.2 *Set Up* Simulasi dengan Ansys Workbench



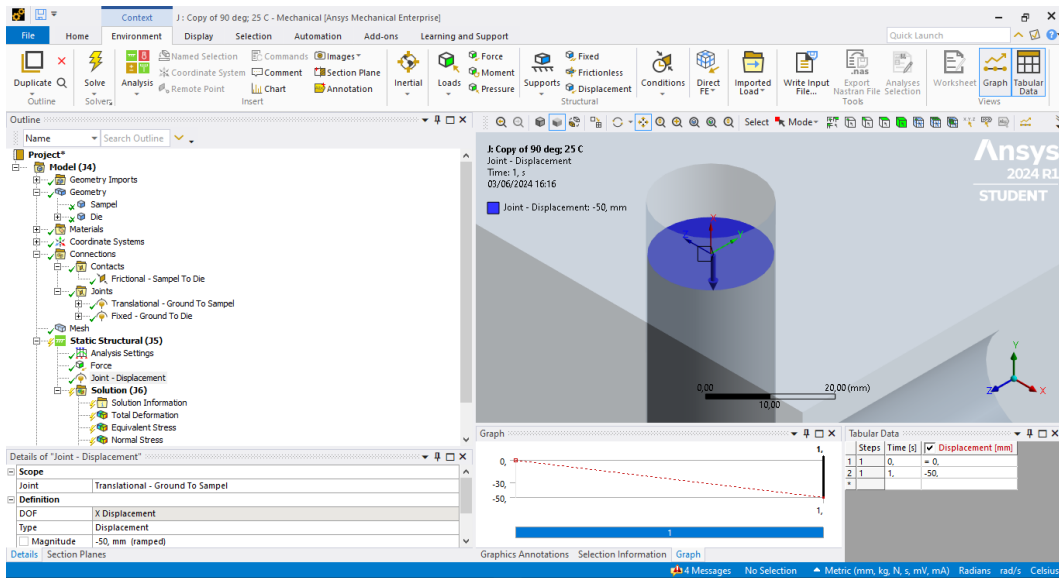
Gambar B.2 Pembuatan Sistem Analisis *Static Structural*



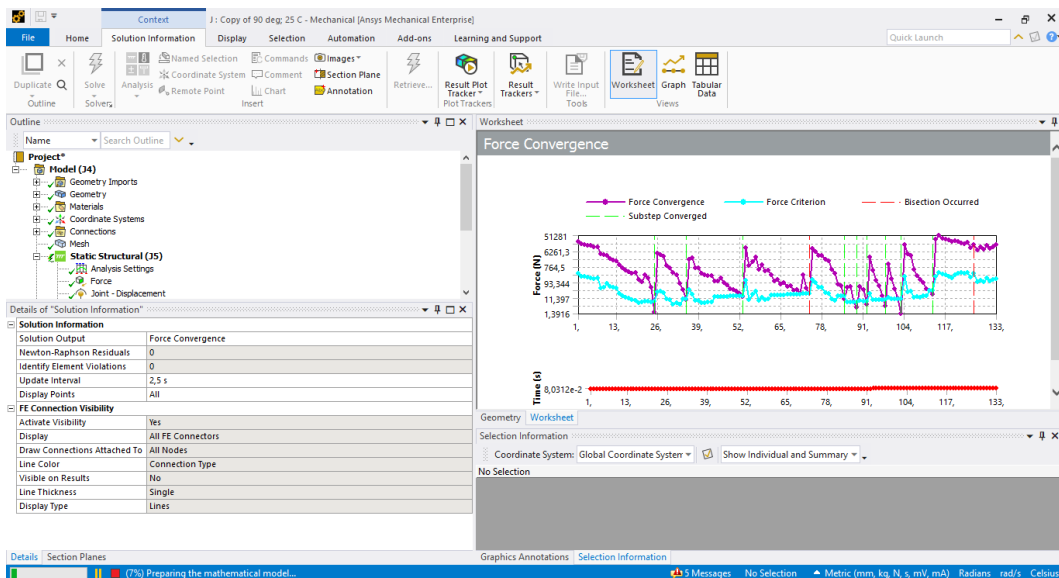
Gambar B.3 Pembuatan *Material Properties* Aluminium AA1100



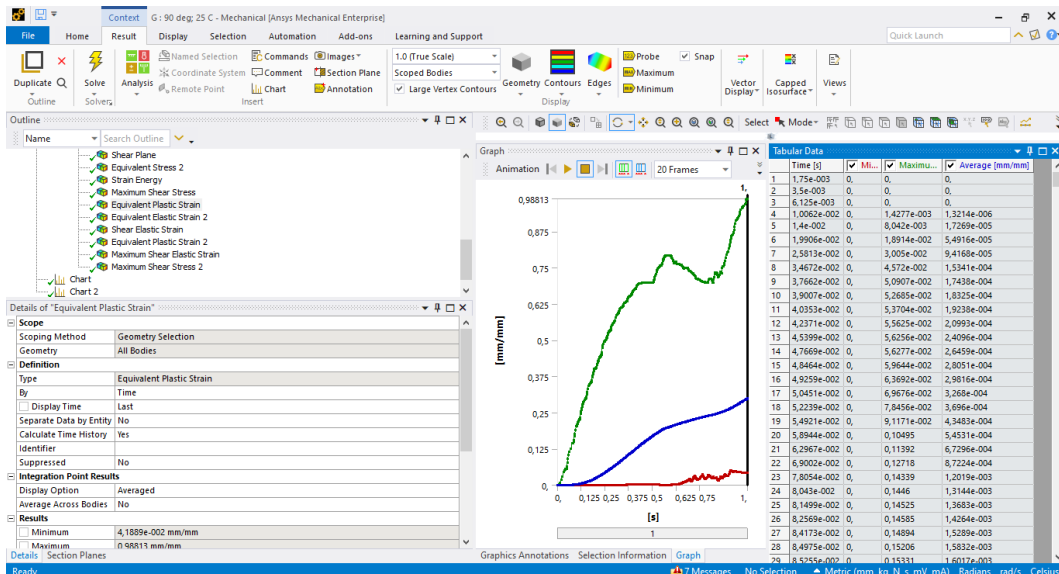
Gambar B.4 Meshing Geometri



Gambar B.5 Set Up Simulasi



Gambar B.6 Solving Simulation



Gambar B.7 Pengumpulan Data Hasil Simulasi

LAMPIRAN C
DATA HASIL PENELITIAN

Lampiran C. Data Hasil Penelitian

C.1 Tabel Hasil Simulasi

Tabel C.1 Data Jumlah *Nodes*, Elemen, dan Nilai *Probe stress*

Jumlah <i>Nodes</i>	Jumlah Elemen	<i>Probe stress</i> (MPa)
836	711	268,66
1219	1044	134,06
1943	1791	237,31
3465	3138	163,23
6527	6035	112,24
9411	8770	115,82
13482	12688	115,42
18528	17429	119,46

Tabel C.2 Data Tegangan geser Maksimum

Temperatur (°C)	Sudut <i>Channel</i>	Tegangan geser Maksimum (MPa)	Rata-rata Tegangan Ekivalen (MPa)
25	90	165,65	294,19
	105	148,15	263,14
	120	128,62	229,39
100	90	163,78	290,89
	105	147,63	262,18
	120	127,89	228,1
200	90	161,25	286,38
	105	145,33	258,03
	120	125,4	223,67

Tabel C.3 Data Regangan Plastis Ekivalen

Temperatur (°C)	Sudut <i>Channel</i>	<i>Min</i> ϵ_p (MPa)	<i>Max</i> ϵ_p (MPa)	<i>Avg</i> ϵ_p (MPa)	SII
25	90	4,19E-02	0,98813	0,29882	3,166592
	105	6,51E-02	0,78708	0,28549	2,528694
	120	6,24E-02	0,63495	0,25351	2,258388
100	90	4,12E-02	0,99146	0,2981	3,187608
	105	5,97E-02	0,77388	0,28503	2,505806
	120	6,21E-02	0,63227	0,25277	2,255865
200	90	3,83E-02	0,99895	0,29538	3,25239
	105	6,50E-02	0,77633	0,28252	2,517860
	120	5,69E-02	0,61893	0,25016	2,246798

Tabel C.4 Data Peningkatan Nilai Tegangan Ekivalen dan Tegangan Geser

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
0,088	0,029	0,054	0,500	0,046	0,089	0,250	0,031	0,060
0,175	0,053	0,097	1,000	0,153	0,278	0,500	0,062	0,119
0,306	0,090	0,167	1,375	1,140	2,163	0,875	0,105	0,201
0,503	0,761	1,405	1,750	2,853	5,437	1,250	0,153	0,293
0,700	1,307	2,401	2,125	4,312	8,202	1,813	0,198	0,379
0,995	1,537	2,817	2,266	4,537	8,642	2,094	1,310	2,516
1,291	1,696	3,106	2,406	4,886	9,311	2,375	2,556	4,899
1,734	1,965	3,602	2,422	4,927	9,387	2,412	2,904	5,569
1,883	2,042	3,744	2,438	4,964	9,457	2,449	3,335	6,396
1,950	2,215	4,067	2,462	5,035	9,593	2,504	4,027	7,718
2,018	2,526	4,644	2,497	5,138	9,790	2,587	4,941	9,461
2,119	2,827	5,194	2,551	5,255	10,015	2,712	5,622	10,723
2,270	3,195	5,868	2,604	5,356	10,210	2,732	5,658	10,790
2,384	3,682	6,740	2,684	5,501	10,490	2,751	5,686	10,843
2,423	3,722	6,809	2,804	5,687	10,837	2,781	5,758	10,977
2,463	3,754	6,866	2,924	5,879	11,142	2,810	5,797	11,048
2,523	3,809	6,969	3,105	6,109	11,568	2,854	5,847	11,142
2,612	3,943	7,213	3,375	6,436	12,190	2,920	5,925	11,286

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
2,746	4,184	7,658	3,780	7,089	13,371	2,987	6,001	11,428
2,947	4,745	8,667	3,805	7,109	13,409	3,086	6,098	11,608
3,148	5,153	9,407	3,830	7,146	13,480	3,235	6,253	11,893
3,450	5,757	10,501	3,867	7,284	13,738	3,384	6,415	12,188
3,903	6,671	12,173	3,923	7,609	14,345	3,607	6,705	12,727
4,022	6,937	12,672	3,979	7,866	14,813	3,943	7,003	13,265
4,075	7,052	12,876	4,063	8,202	15,419	3,964	7,019	13,294
4,128	7,225	13,197	4,189	8,469	15,910	3,986	7,040	13,330
4,209	7,503	13,711	4,211	8,502	15,971	4,018	7,081	13,405
4,249	7,601	13,885	4,233	8,534	16,030	4,051	7,127	13,488
4,263	7,639	13,948	4,266	8,590	16,134	4,099	7,209	13,638
4,277	7,881	14,361	4,315	9,051	17,001	4,112	7,240	13,693
4,298	8,210	14,951	4,340	9,124	17,132	4,125	7,275	13,758
4,329	8,373	15,246	4,365	9,183	17,238	4,144	7,341	13,877
4,377	8,557	15,580	4,402	9,258	17,373	4,172	7,479	14,128
4,448	8,805	16,031	4,457	9,369	17,574	4,215	7,733	14,608
4,554	9,133	16,627	4,541	9,534	17,875	4,244	7,851	14,826
4,714	9,589	17,463	4,666	9,792	18,349	4,273	7,938	14,986
4,954	10,629	19,360	4,854	10,170	18,989	4,317	8,050	15,194
5,008	10,837	19,742	5,042	10,622	19,835	4,382	8,196	15,458
5,062	10,916	19,881	5,230	11,029	20,622	4,480	8,395	15,819
5,143	11,006	20,046	5,512	11,959	22,342	4,627	8,671	16,319
5,264	11,146	20,318	5,611	12,127	22,624	4,847	9,062	17,026
5,355	11,258	20,533	5,645	12,202	22,748	4,924	9,188	17,252
5,446	11,983	21,860	5,680	12,262	22,844	5,001	9,437	17,730
5,494	12,072	22,027	5,732	12,361	23,029	5,117	9,597	17,999
5,542	12,148	22,167	5,809	12,531	23,344	5,233	9,835	18,437
5,614	12,190	22,258	5,926	12,787	23,810	5,319	10,258	19,229
5,685	12,315	22,486	6,042	13,054	24,297	5,350	10,320	19,344
5,793	12,511	22,860	6,159	13,288	24,723	5,363	10,339	19,377
5,806	12,535	22,906	6,173	13,307	24,759	5,377	10,369	19,433
5,819	12,559	22,954	6,187	13,333	24,805	5,398	10,412	19,513
5,839	12,594	23,023	6,207	13,393	24,917	5,428	10,472	19,624
5,869	12,638	23,108	6,212	13,216	24,579	5,474	10,568	19,801
5,898	12,693	23,217	6,217	13,207	24,562	5,544	10,744	20,131
5,943	12,787	23,394	6,225	13,346	24,827	5,613	10,897	20,416
6,010	12,958	23,723	6,232	13,392	24,906	5,717	11,138	20,861
6,110	13,204	24,187	6,243	13,596	25,272	5,872	11,497	21,515
6,162	13,357	24,479	6,255	13,707	25,471	6,106	12,534	23,401
6,215	13,556	24,847	6,272	13,861	25,747	6,222	12,808	23,897
6,293	13,917	25,465	6,297	13,997	25,988	6,275	12,937	24,131

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
6,312	13,988	25,600	6,335	14,136	26,234	6,327	13,119	24,454
6,331	14,031	25,682	6,392	14,292	26,509	6,406	13,378	24,922
6,359	14,121	25,850	6,477	14,499	26,877	6,524	13,717	25,524
6,400	14,181	25,957	6,605	14,787	27,382	6,702	14,146	26,278
6,442	14,264	26,113	6,798	15,248	28,165	6,733	14,229	26,423
6,505	14,405	26,369	6,990	15,718	28,984	6,764	14,284	26,520
6,599	14,656	26,814	7,182	16,186	29,794	6,810	14,366	26,664
6,694	14,955	27,361	7,200	16,212	29,836	6,880	14,429	26,777
6,835	15,377	28,119	7,217	16,242	29,888	6,950	14,597	27,077
6,976	15,778	28,842	7,244	16,297	29,984	6,997	14,726	27,308
7,188	16,364	29,891	7,284	16,384	30,147	7,044	14,845	27,524
7,244	16,668	30,449	7,323	16,481	30,322	7,053	14,790	27,426
7,263	16,609	30,333	7,383	16,717	30,755	7,061	14,861	27,558
7,283	16,642	30,403	7,404	16,798	30,895	7,074	14,981	27,754
7,312	16,677	30,477	7,425	16,784	30,832	7,087	15,053	27,849
7,356	17,007	31,098	7,446	16,698	30,631	7,097	15,110	27,931
7,378	17,223	31,472	7,477	16,913	31,002	7,107	15,216	28,103
7,400	17,409	31,771	7,524	17,249	31,614	7,109	14,904	27,498
7,433	17,463	31,772	7,540	17,360	31,824	7,112	14,829	27,349
7,441	17,393	31,627	7,545	16,956	31,023	7,116	14,946	27,569
7,446	17,213	31,274	7,550	16,878	30,866	7,119	15,005	27,679
7,451	17,211	31,265	7,558	17,096	31,290	7,125	15,174	28,001
7,459	17,450	31,715	7,569	17,367	31,822	7,131	15,248	28,137
7,470	17,712	32,216	7,586	17,546	32,175	7,133	15,063	27,779
7,487	17,914	32,608	7,611	17,679	32,435	7,136	15,012	27,679
7,512	18,054	32,876	7,649	17,848	32,759	7,139	15,124	27,890
7,537	18,186	33,122	7,706	18,048	33,125	7,145	15,292	28,210
7,575	18,341	33,417	7,763	18,269	33,530	7,153	15,415	28,429
7,632	18,515	33,742	7,848	18,562	34,070	7,166	15,530	28,638
7,718	18,755	34,198	7,934	18,794	34,503	7,185	15,622	28,803
7,846	19,074	34,801	8,062	19,111	35,098	7,213	15,721	28,978
8,038	19,513	35,642	8,190	19,488	35,822	7,256	15,837	29,184
8,230	19,890	36,342	8,318	19,814	36,425	7,320	16,003	29,478
8,264	19,795	36,158	8,338	19,841	36,461	7,416	16,275	29,963
8,279	19,722	36,014	8,359	19,885	36,533	7,560	16,696	30,718
8,294	19,698	35,963	8,389	19,933	36,613	7,705	17,108	31,434
8,317	19,632	35,829	8,419	19,991	36,706	7,759	17,248	31,666
8,325	19,143	34,879	8,449	20,013	36,713	7,813	17,430	31,987
8,333	19,077	34,745	8,465	19,921	36,519	7,853	17,604	32,307
8,341	19,088	34,762	8,481	19,884	36,437	7,856	16,771	30,679
8,353	19,387	35,336	8,505	19,928	36,523	7,858	16,518	30,183

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
8,371	19,741	36,023	8,541	19,971	36,607	7,862	16,625	30,387
8,398	19,886	36,303	8,595	20,064	36,740	7,868	16,891	30,905
8,438	20,029	36,574	8,648	20,185	36,927	7,876	17,195	31,493
8,498	20,211	36,916	8,729	20,395	37,262	7,889	17,510	32,087
8,589	20,466	37,382	8,809	20,604	37,598	7,908	17,669	32,370
8,679	20,698	37,798	8,930	20,999	38,296	7,927	17,730	32,464
8,815	21,259	38,850	9,050	21,330	38,845	7,955	17,905	32,778
8,862	21,455	39,212	9,073	21,384	38,928	7,984	18,057	33,053
8,886	21,524	39,332	9,095	21,412	38,969	8,026	18,243	33,382
8,910	21,560	39,392	9,128	21,500	39,111	8,090	18,477	33,799
8,946	21,669	39,600	9,161	21,582	39,249	8,187	18,751	34,290
8,981	21,805	39,855	9,211	21,720	39,492	8,283	19,032	34,824
9,035	22,020	40,252	9,237	21,809	39,655	8,427	19,430	35,603
9,115	22,280	40,729	9,264	21,856	39,740	8,571	19,821	36,335
9,195	22,533	41,200	9,303	21,956	39,924	8,715	20,155	36,948
9,315	22,954	41,982	9,362	22,124	40,224	8,859	20,516	37,605
9,347	23,063	42,183	9,450	22,371	40,657	8,893	20,650	37,856
9,379	23,085	42,213	9,539	22,632	41,128	8,927	20,600	37,741
9,426	23,228	42,478	9,554	22,592	41,052	8,979	20,828	38,152
9,497	23,408	42,793	9,570	22,624	41,111	9,030	20,962	38,390
9,568	23,482	42,920	9,593	22,739	41,330	9,106	21,160	38,729
9,616	23,356	42,656	9,616	22,825	41,488	9,183	21,200	38,767
9,633	23,356	42,653	9,651	22,932	41,681	9,192	20,877	38,131
9,650	23,331	42,585	9,686	23,020	41,849	9,202	20,873	38,110
9,675	23,413	42,718	9,721	23,091	41,987	9,216	21,045	38,422
9,712	23,358	42,607	9,773	23,247	42,270	9,230	21,051	38,403
9,750	23,556	42,979	9,825	23,339	42,434	9,251	21,094	38,450
9,807	23,873	43,571	9,860	23,350	42,457	9,283	21,180	38,564
9,864	24,114	43,985	9,895	23,308	42,404	9,314	21,262	38,683
9,920	24,316	44,279	9,948	23,528	42,813	9,362	21,434	38,965
9,946	24,411	44,422	10,028	24,073	43,817	9,387	21,574	39,204
9,955	24,057	43,749	10,107	24,337	44,276	9,412	21,687	39,393
9,964	23,959	43,558	10,128	24,415	44,447	9,449	21,854	39,684
9,977	24,288	44,180	10,149	24,475	44,545	9,505	22,074	40,087
9,997	24,559	44,673	10,180	24,562	44,755	9,590	22,369	40,607
10,027	24,670	44,828	10,211	24,649	44,943	9,716	22,874	41,522
10,057	24,758	44,963	10,258	24,799	45,229	9,779	23,153	42,037
10,102	24,888	45,173	10,305	24,966	45,512	9,842	23,381	42,463
10,170	25,086	45,473	10,375	25,218	45,925	9,937	23,694	43,047
10,272	25,428	45,982	10,445	25,489	46,337	9,970	23,772	43,192
10,373	25,679	46,419	10,515	25,770	46,712	10,003	23,845	43,328

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
10,409	25,782	46,590	10,586	26,004	47,075	10,053	23,968	43,562
10,444	25,851	46,714	10,691	26,327	47,553	10,127	24,147	43,937
10,498	25,979	46,939	10,797	26,595	47,981	10,202	24,294	44,194
10,578	26,168	47,256	10,815	26,481	47,780	10,277	24,325	44,188
10,614	26,246	47,372	10,833	26,490	47,808	10,351	24,527	44,536
10,650	26,307	47,472	10,861	26,654	48,133	10,379	24,635	44,751
10,665	26,265	47,396	10,903	26,763	48,345	10,407	24,704	44,873
10,681	26,227	47,331	10,944	26,856	48,519	10,449	24,807	45,076
10,704	26,370	47,597	10,986	26,949	48,677	10,512	24,956	45,363
10,727	26,413	47,671	11,048	27,110	48,949	10,575	25,105	45,651
10,762	26,549	47,903	11,070	27,102	48,939	10,638	25,256	45,946
10,797	26,635	48,046	11,091	27,091	48,923	10,685	25,377	46,198
10,849	26,729	48,200	11,124	27,205	49,130	10,721	25,443	46,314
10,873	26,685	48,109	11,157	27,259	49,224	10,756	25,533	46,474
10,896	26,708	48,150	11,206	27,240	49,171	10,809	25,665	46,700
10,931	26,783	48,281	11,255	27,265	49,215	10,862	25,788	46,929
10,984	26,769	48,234	11,328	27,539	49,715	10,915	25,913	47,150
11,063	26,696	48,073	11,402	27,796	50,173	10,951	26,028	47,369
11,143	26,999	48,629	11,512	28,136	50,757	10,987	26,141	47,555
11,262	27,412	49,330	11,622	28,475	51,298	11,041	26,302	47,813
11,380	27,836	50,055	11,733	28,810	51,797	11,081	26,455	48,039
11,421	28,012	50,340	11,843	29,114	52,283	11,122	26,491	48,070
11,435	27,816	49,995	11,953	29,391	52,731	11,162	26,688	48,410
11,444	27,445	49,338	12,064	29,677	53,173	11,222	26,855	48,675
11,454	27,344	49,167	12,174	29,966	53,625	11,250	26,940	48,798
11,468	27,690	49,811	12,284	30,208	54,048	11,263	26,821	48,586
11,482	27,825	50,065	12,450	30,545	54,638	11,277	26,766	48,479
11,504	28,116	50,592	12,482	30,612	54,750	11,297	27,040	48,984
11,536	28,291	50,885	12,514	30,647	54,820	11,318	27,080	49,038
11,585	28,457	51,157	12,530	30,626	54,797	11,348	27,196	49,224
11,633	28,588	51,372	12,547	30,614	54,776	11,379	27,296	49,376
11,706	28,769	51,674	12,572	30,714	54,943	11,425	27,421	49,574
11,814	29,051	52,136	12,598	30,750	55,003	11,445	27,467	49,662
11,923	29,335	52,584	12,611	30,679	54,887	11,466	27,522	49,758
12,032	29,607	53,028	12,624	30,691	54,904	11,480	27,492	49,704
12,196	29,925	53,567	12,644	30,810	55,099	11,494	27,510	49,734
12,359	30,353	54,308	12,674	30,985	55,389	11,515	27,639	49,955
12,522	30,730	55,007	12,718	31,117	55,601	11,536	27,580	49,832
12,686	31,181	55,715	12,763	31,201	55,738	11,567	27,733	50,106
12,759	31,314	55,948	12,830	31,312	55,919	11,583	27,763	50,167
12,785	31,233	55,811	12,897	31,388	56,036	11,599	27,786	50,203

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
12,811	31,249	55,834	12,964	31,507	56,232	11,622	27,880	50,343
12,824	31, 218	55,794	12,999	31,645	56,459	11,646	27,950	50,453
12,838	31,174	55,709	13,018	31,694	56,542	11,663	27,933	50,414
12,843	30,740	54,945	13,037	31,754	56,644	11,681	27,994	50,524
12,848	30,553	54,618	13,048	31,571	56,323	11,708	28,013	50,538
12,855	30,694	54,863	13,058	31,545	56,274	11,734	28,119	50,720
12,866	31,041	55,480	13,063	31,190	55,643	11,752	28,113	50,700
12,871	30,794	55,050	13,068	31,007	55,313	11,770	28,167	50,793
12,876	30,683	54,859	13,075	31,150	55,569	11,797	28,225	50,879
12,884	30,834	55,125	13,086	31,483	56,164	11,824	28,275	50,960
12,895	31,144	55,672	13,103	31,878	56,857	11,842	28,288	50,976
12,912	31,513	56,299	13,129	32,013	57,079	11,860	28,307	51,017
12,937	31,683	56,561	13,154	32,096	57,224	11,887	28,385	51,166
12,975	31,790	56,762	13,192	32,208	57,409	11,914	28,446	51,269
13,013	31,888	56,956	13,230	32,335	57,618	11,955	28,551	51,435
13,070	32,020	57,239	13,287	32,510	57,893	11,996	28,661	51,592
13,127	32,183	57,561	13,344	32,653	58,131	12,026	28,790	51,782
13,213	32,419	57,980	13,429	32,894	58,549	12,057	28,878	51,917
13,341	32,745	58,596	13,515	33,144	59,016	12,102	29,037	52,149
13,469	33,078	59,227	13,643	33,514	59,766	12,148	29,179	52,345
13,503	33,181	59,434	13,835	34,005	60,669	12,217	29,473	52,762
13,536	33,181	59,463	14,027	34,551	61,635	12,286	29,708	53,141
13,587	33,393	59,834	14,047	34,538	61,637	12,389	30,006	53,652
13,662	33,624	60,232	14,066	34,554	61,663	12,492	30,262	54,117
13,738	33,832	60,605	14,095	34,706	61,920	12,544	30,390	54,359
13,770	33,962	60,823	14,139	34,848	62,154	12,595	30,514	54,592
13,802	33,967	60,849	14,205	35,030	62,496	12,672	30,688	54,897
13,816	33,920	60,799	14,270	35,219	62,854	12,788	31,010	55,465
13,830	33,971	60,902	14,369	35,496	63,330	12,904	31,344	56,027
13,850	34,110	61,126	14,517	35,913	64,038	13,020	31,597	56,468
13,882	34,269	61,389	14,583	36,134	64,403	13,136	31,934	57,020
13,928	34,437	61,690	14,607	36,092	64,319	13,310	32,296	57,642
13,998	34,642	62,054	14,630	36,164	64,446	13,332	32,382	57,792
14,068	34,826	62,380	14,665	36,314	64,699	13,353	32,393	57,815
14,173	35,090	62,858	14,700	36,416	64,892	13,385	32,489	57,981
14,278	35,341	63,403	14,752	36,552	65,181	13,433	32,685	58,318
14,436	35,743	64,228	14,831	36,779	65,632	13,481	32,831	58,593
14,445	35,340	63,552	14,948	37,121	66,262	13,529	32,961	58,843
14,455	35,263	63,425	15,066	37,479	66,891	13,601	33,161	59,197
14,469	35,440	63,736	15,243	37,958	67,753	13,709	33,435	59,709
14,491	35,646	64,088	15,420	38,439	68,600	13,817	33,683	60,146

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
14,524	35,840	64,422	15,597	38,952	69,500	13,978	34,118	60,903
14,573	36,047	64,752	15,773	39,450	70,372	14,140	34,503	61,586
14,646	36,217	65,032	15,950	39,954	71,252	14,302	34,913	62,286
14,719	36,445	65,427	15,972	39,994	71,352	14,464	35,381	63,106
14,829	36,810	66,060	15,993	40,048	71,455	14,626	35,834	63,892
14,939	37,155	66,655	16,026	40,143	71,630	14,788	36,214	64,635
15,104	37,595	67,481	16,058	40,216	71,780	14,950	36,585	65,261
15,268	38,084	68,289	16,107	40,316	71,988	14,975	36,629	65,351
15,516	38,752	69,531	16,156	40,440	72,232	14,984	36,403	64,971
15,701	39,307	70,543	16,229	40,644	72,595	14,987	35,790	63,888
15,840	39,701	71,211	16,338	40,918	73,046	14,989	35,521	63,409
15,979	40,102	71,918	16,448	41,241	73,605	14,993	35,591	63,538
16,001	40,148	71,997	16,558	41,586	74,172	14,998	35,820	63,945
16,023	40,164	72,002	16,722	42,067	75,013	15,007	36,108	64,456
16,048	40,233	72,114	16,969	42,859	76,398	15,020	36,429	65,022
16,061	40,208	72,087	17,034	42,953	76,553	15,039	36,680	65,459
16,074	40,255	72,171	17,066	43,072	76,789	15,067	36,793	65,642
16,094	40,381	72,379	17,098	43,151	76,962	15,110	36,861	65,750
16,123	40,509	72,590	17,111	43,119	76,953	15,174	36,992	65,974
16,168	40,658	72,862	17,124	43,151	77,031	15,270	37,250	66,404
16,234	40,870	73,235	17,143	43,263	77,233	15,297	37,306	66,499
16,301	41,058	73,532	17,172	43,347	77,385	15,325	37,342	66,555
16,400	41,321	73,971	17,200	43,407	77,509	15,366	37,475	66,777
16,550	41,816	74,842	17,243	43,482	77,638	15,427	37,662	67,111
16,573	41,862	74,936	17,308	43,589	77,807	15,519	37,908	67,557
16,597	41,899	75,000	17,405	43,813	78,199	15,612	38,202	68,081
16,632	42,015	75,195	17,550	44,226	78,966	15,750	38,643	68,923
16,685	42,189	75,509	17,769	44,971	80,228	15,888	39,058	69,666
16,764	42,437	75,949	17,801	45,074	80,410	16,096	39,684	70,784
16,883	42,847	76,672	17,832	45,183	80,597	16,303	40,163	71,586
17,062	43,400	77,604	17,880	45,324	80,825	16,381	40,339	71,913
17,125	43,552	77,870	17,952	45,554	81,211	16,408	40,444	72,099
17,146	43,590	77,948	18,060	45,889	81,800	16,418	40,037	71,396
17,168	43,640	78,026	18,168	46,226	82,364	16,427	40,053	71,426
17,180	43,597	77,973	18,330	46,712	83,216	16,442	40,173	71,620
17,191	43,619	78,011	18,491	47,133	84,021	16,463	40,350	71,899
17,196	43,262	77,375	18,653	47,568	84,788	16,495	40,498	72,133
17,201	43,177	77,219	18,896	48,315	86,081	16,544	40,667	72,427
17,229	43,700	78,109	19,138	49,009	87,268	16,616	40,844	72,745
17,239	43,641	78,018	19,502	50,063	89,111	16,688	41,015	73,048
17,248	43,635	78,009	19,531	50,103	89,184	16,797	41,308	73,583

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
17,263	43,777	78,256	19,560	50,146	89,255	16,906	41,589	74,087
17,284	43,945	78,540	19,603	50,250	89,427	16,925	41,633	74,178
17,317	44,090	78,785	19,646	50,358	89,617	16,945	41,671	74,249
17,366	44,237	79,037	19,710	50,520	89,927	16,975	41,762	74,401
17,439	44,470	79,463	19,807	50,766	90,404	17,020	41,879	74,600
17,549	44,858	80,193	19,903	50,939	90,708	17,088	42,048	74,909
17,714	45,383	81,175	20,049	51,276	91,289	17,189	42,259	75,288
17,879	45,947	82,109	20,125	51,448	91,579	17,290	42,479	75,663
18,126	46,793	83,548	20,201	51,524	91,655	17,441	42,805	76,261
18,156	46,871	83,692	20,315	51,746	92,015	17,668	43,274	77,067
18,186	46,932	83,788	20,355	51,780	92,053	17,896	43,727	77,882
18,232	47,096	84,038	20,376	51,828	92,156	17,981	43,920	78,224
18,254	47,142	84,121	20,398	51,876	92,232	18,056	44,013	78,390
18,276	47,212	84,242	20,430	51,872	92,206	18,131	44,063	78,459
18,309	47,335	84,444	20,462	51,895	92,244	18,170	44,130	78,575
18,359	47,493	84,724	20,479	51,929	92,321	18,210	44,201	78,684
18,433	47,705	85,091	20,495	51,997	92,452	18,269	44,214	78,701
18,507	47,879	85,390	20,504	51,943	92,385	18,300	44,195	78,656
18,619	48,184	85,941	20,513	51,975	92,454	18,329	44,279	78,806
18,786	48,639	86,756	20,526	52,058	92,582	18,359	44,307	78,854
18,954	49,203	87,790	20,546	52,114	92,655	18,403	44,355	78,930
18,971	49,197	87,814	20,576	52,192	92,777	18,447	44,467	79,150
18,987	49,235	87,891	20,621	52,242	92,871	18,513	44,653	79,507
19,012	49,350	88,071	20,688	52,380	93,143	18,613	44,954	80,080
19,050	49,488	88,303	20,788	52,629	93,639	18,712	45,249	80,634
19,107	49,672	88,627	20,889	52,901	94,186	18,861	45,714	81,484
19,191	49,940	89,092	20,924	53,023	94,410	19,085	46,225	82,406
19,318	50,289	89,663	20,959	53,128	94,606	19,163	46,398	82,738
19,446	50,663	90,329	21,012	53,271	94,869	19,214	46,487	82,921
19,487	50,786	90,550	21,091	53,494	95,253	19,264	46,568	83,060
19,502	50,721	90,477	21,170	53,680	95,550	19,302	46,649	83,189
19,516	50,740	90,531	21,289	54,046	96,213	19,315	46,548	83,033
19,524	50,523	90,169	21,467	54,614	97,258	19,328	46,568	83,073
19,529	50,363	89,911	21,645	55,160	98,237	19,348	46,734	83,361
19,534	50,359	89,929	21,739	55,238	98,348	19,378	46,899	83,628
19,542	50,470	90,126	21,832	55,500	98,778	19,422	47,010	83,815
19,553	50,569	90,270	21,850	55,519	98,833	19,467	47,136	84,044
19,570	50,570	90,234	21,868	55,558	98,921	19,534	47,316	84,370
19,587	50,566	90,199	21,895	55,638	99,040	19,634	47,626	84,919
19,612	50,728	90,445	21,904	55,629	99,063	19,785	48,013	85,595
19,650	50,901	90,714	21,914	55,690	99,188	19,935	48,374	86,266

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
19,707	51,101	91,052	21,928	55,713	99,217	19,963	48,464	86,433
19,792	51,388	91,606	21,949	55,695	99,166	19,991	48,535	86,568
19,878	51,672	92,125	21,980	55,764	99,281	20,032	48,656	86,771
20,006	52,035	92,840	22,028	55,849	99,441	20,095	48,819	87,040
20,198	52,608	93,806	22,099	56,089	99,904	20,188	49,058	87,470
20,486	53,562	95,391	22,206	56,435	100,540	20,281	49,299	87,880
20,522	53,635	95,529	22,312	56,670	100,950	20,421	49,579	88,360
20,539	53,642	95,571	22,339	56,784	101,150	20,561	49,890	88,909
20,557	53,677	95,644	22,366	56,888	101,320	20,772	49,908	88,946
20,583	53,758	95,767	22,407	56,981	101,470	20,845	49,691	88,560
20,623	53,872	95,944	22,467	57,110	101,700	20,912	49,555	88,303
20,683	54,015	96,185	22,558	57,328	102,070	20,935	49,543	88,278
20,772	54,222	96,526	22,649	57,541	102,440	20,959	49,618	88,415
20,862	54,406	96,806	22,785	57,792	102,840	20,971	49,570	88,358
20,996	54,694	97,321	22,989	58,072	103,360	20,983	49,632	88,473
21,130	55,092	98,135	23,194	58,042	103,270	20,987	49,309	87,926
21,331	55,605	99,088	23,301	58,089	103,360	20,992	49,233	87,789
21,437	55,891	99,625	23,339	58,055	103,280	20,998	49,343	87,983
21,463	55,979	99,818	23,352	58,057	103,290	21,008	49,477	88,206
21,489	56,070	99,998	23,365	58,059	103,300	21,018	49,545	88,324
21,498	55,967	99,894	23,385	58,017	103,200	21,028	49,593	88,407
21,503	55,865	99,774	23,414	57,924	103,010	21,035	49,553	88,344
21,508	55,915	99,882	23,459	57,830	102,840	21,043	49,553	88,349
21,516	55,947	99,951	23,525	57,936	103,050	21,054	49,661	88,529
21,527	55,963	99,953	23,592	58,078	103,320	21,071	49,765	88,691
21,544	55,938	99,848	23,691	58,367	103,850	21,097	49,832	88,790
21,569	56,016	99,939	23,791	58,622	104,320	21,136	49,835	88,797
21,607	56,206	100,260	23,941	58,921	104,830	21,193	49,999	89,099
21,645	56,328	100,450	24,091	59,122	105,190	21,280	50,248	89,547
21,702	56,538	100,830	24,315	59,348	105,610	21,410	50,505	90,026
21,759	56,713	101,160	24,540	59,670	106,230	21,540	50,746	90,467
21,845	56,989	101,680	24,764	60,162	107,070	21,736	51,235	91,326
21,930	57,237	102,140	24,882	60,259	107,250	21,833	51,394	91,567
22,058	57,659	102,900	24,897	60,280	107,320	21,877	51,479	91,714
22,250	58,198	103,830	24,911	60,340	107,440	21,921	51,568	91,865
22,347	58,436	104,200	24,933	60,397	107,510	21,936	51,558	91,868
22,380	58,562	104,420	24,965	60,482	107,640	21,952	51,602	91,949
22,414	58,666	104,610	25,014	60,553	107,750	21,963	51,597	91,950
22,464	58,769	104,760	25,087	60,660	107,920	21,973	51,597	91,957
22,491	58,817	104,860	25,197	60,799	108,140	21,982	51,611	91,987
22,517	58,889	105,000	25,361	61,117	108,710	21,996	51,684	92,106

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
22,531	58,906	105,070	25,526	61,197	108,830	22,018	51,756	92,218
22,545	58,973	105,210	25,690	61,493	109,420	22,050	51,811	92,312
22,566	59,019	105,290	25,777	61,627	109,690	22,098	51,888	92,455
22,597	59,107	105,430	25,863	61,667	109,740	22,169	52,058	92,743
22,644	59,248	105,690	25,879	61,625	109,660	22,241	52,155	92,902
22,715	59,434	106,050	25,895	61,679	109,760	22,349	52,248	93,032
22,785	59,572	106,280	25,903	61,669	109,770	22,511	52,605	93,651
22,891	59,775	106,670	25,911	61,720	109,880	22,626	52,833	94,060
22,996	60,164	107,390	25,924	61,733	109,880	22,643	52,820	94,060
23,102	60,489	107,970	25,943	61,666	109,730	22,661	52,856	94,111
23,157	60,600	108,170	25,971	61,666	109,710	22,688	52,870	94,115
23,213	60,772	108,480	26,013	61,701	109,780	22,728	52,850	94,069
23,226	60,792	108,570	26,076	61,773	109,910	22,768	52,911	94,179
23,239	60,856	108,700	26,171	61,890	110,120	22,829	53,051	94,431
23,244	60,851	108,740	26,266	61,840	110,000	22,919	53,177	94,666
23,419	61,189	109,190	26,316	61,966	110,230	23,054	53,398	95,055
23,480	61,386	109,500	26,366	62,045	110,370	23,156	53,268	94,807
23,541	61,522	109,720	26,384	62,111	110,490	23,168	53,215	94,735
23,568	61,568	109,820	26,389	62,017	110,360	23,181	53,286	94,857
23,576	61,596	109,950	26,394	62,096	110,530	23,187	53,219	94,768
23,583	61,689	110,160	26,401	62,220	110,750	23,194	53,237	94,806
23,588	61,746	110,300	26,412	62,242	110,760	23,196	53,081	94,557
23,667	61,718	110,100	26,429	62,161	110,570	23,199	53,063	94,541
23,695	61,855	110,370	26,455	62,252	110,710	23,374	53,433	95,091
23,722	61,969	110,590	26,493	62,225	110,640	23,401	53,549	95,310
23,736	62,050	110,780	26,550	62,143	110,460	23,411	53,530	95,318
23,741	62,164	111,070	26,635	62,201	110,570	23,421	53,583	95,426
23,746	62,249	111,270	26,763	62,684	111,370	23,435	53,656	95,536
23,754	62,287	111,340	26,808	63,000	111,880	23,457	53,704	95,600
23,765	62,230	111,210	26,829	63,050	111,960	23,489	53,655	95,497
23,782	62,115	110,930	26,851	63,248	112,290	23,538	53,560	95,286
23,807	62,093	110,840	26,883	63,464	112,640	23,611	53,544	95,219
23,845	62,214	111,030	26,900	63,576	112,840	23,685	53,672	95,443
23,902	62,333	111,230	26,917	63,725	113,090	23,795	53,930	95,928
23,988	62,516	111,530	26,926	63,774	113,180	23,959	54,313	96,647
24,073	62,740	111,950	26,935	63,908	113,420	23,990	54,344	96,702
24,201	63,169	112,710	26,940	63,939	113,480	24,020	54,328	96,670
24,268	63,351	113,040	26,945	64,041	113,670	24,065	54,416	96,823
24,336	63,483	113,260	26,950	64,130	113,820	24,134	54,520	97,003
24,371	63,536	113,320	27,004	63,870	113,210	24,236	54,794	97,518
24,406	63,568	113,360	27,024	64,078	113,570	24,338	55,063	98,008

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
24,425	63,540	113,300	27,043	64,245	113,850	24,440	55,210	98,254
24,443	63,554	113,320	27,053	64,326	113,970	24,594	55,394	98,544
24,453	63,633	113,510	27,063	64,506	114,290	24,622	55,433	98,598
24,463	63,676	113,610	27,068	64,584	114,430	24,650	55,490	98,688
24,477	63,692	113,610	27,073	64,703	114,650	24,692	55,560	98,796
24,482	63,709	113,700	27,080	64,823	114,860	24,756	55,636	98,925
24,487	63,732	113,770	27,091	64,837	114,870	24,851	55,663	98,959
24,492	63,730	113,790	27,108	64,779	114,750	24,993	55,770	99,185
24,497	63,738	113,810	27,134	64,809	114,790	25,019	55,819	99,288
24,505	63,694	113,710	27,172	65,128	115,340	25,046	55,869	99,394
24,516	63,581	113,460	27,229	65,554	116,080	25,085	55,897	99,449
24,533	63,428	113,110	27,285	65,945	116,750	25,144	55,933	99,519
24,558	63,427	113,050	27,371	66,627	117,970	25,232	56,027	99,701
24,596	63,559	113,280	27,456	67,190	118,960	25,365	56,025	99,682
24,653	63,641	113,410	27,584	67,984	120,310	25,412	55,801	99,251
24,739	63,746	113,610	27,713	68,796	121,740	25,428	55,829	99,306
24,824	63,837	113,790	27,905	69,994	123,780	25,436	55,839	99,352
24,876	63,877	113,880	28,097	71,163	125,800	25,445	55,901	99,466
24,894	63,895	113,940	28,198	71,719	126,750	25,458	55,916	99,452
24,912	63,971	114,090	28,233	71,973	127,190	25,477	55,922	99,415
24,938	63,971	114,080	28,269	72,144	127,490	25,507	55,890	99,335
24,951	63,983	114,140	28,322	72,484	128,110	25,550	55,837	99,233
24,961	64,024	114,250	28,340	72,573	128,280	25,594	55,926	99,392
24,971	64,054	114,320	28,354	72,593	128,310	25,660	56,124	99,749
24,986	63,996	114,190	28,367	72,692	128,490	25,725	56,391	100,200
25,008	63,991	114,140	28,388	72,866	128,790	25,824	56,921	101,110
25,041	63,979	114,110	28,419	73,094	129,170	25,922	57,484	102,050
25,090	64,011	114,160	28,465	73,349	129,640	26,069	58,063	103,000
25,165	64,107	114,340	28,534	73,758	130,370	26,217	58,734	104,140
25,239	64,226	114,530	28,603	74,078	130,930	26,438	59,811	106,000
25,351	64,419	114,870	28,707	74,762	132,120	26,516	60,211	106,710
25,372	64,482	114,990	28,863	75,628	133,650	26,543	60,359	106,980
25,392	64,533	115,090	29,019	76,460	135,130	26,570	60,508	107,240
25,423	64,582	115,150	29,175	77,291	136,590	26,611	60,722	107,610
25,469	64,696	115,340	29,250	77,547	137,020	26,672	61,025	108,130
25,515	64,802	115,540	29,280	77,797	137,480	26,733	61,359	108,690
25,585	64,879	115,670	29,310	77,963	137,770	26,824	61,835	109,520
25,688	65,007	115,910	29,355	78,213	138,190	26,961	62,532	110,690
25,844	65,320	116,400	29,422	78,512	138,710	27,099	63,210	111,890
26,078	65,968	117,570	29,523	79,051	139,650	27,305	64,282	113,800
26,160	66,059	117,730	29,624	79,520	140,480	27,342	64,450	114,090

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
26,242	66,279	118,160	29,775	80,265	141,770	27,356	64,405	114,050
26,285	66,320	118,240	29,828	80,540	142,230	27,369	64,513	114,250
26,328	66,384	118,360	29,881	80,797	142,700	27,389	64,652	114,470
26,345	66,416	118,440	29,908	80,957	142,980	27,397	64,503	114,240
26,350	66,235	118,200	29,936	81,091	143,230	27,399	64,198	113,740
26,355	66,296	118,350	29,978	81,294	143,600	27,402	64,183	113,750
26,417	66,289	118,180	30,040	81,603	144,160	27,406	64,341	114,050
26,478	66,520	118,600	30,134	82,144	145,100	27,411	64,539	114,390
26,510	66,619	118,760	30,228	82,672	146,050	27,420	64,646	114,540
26,542	66,678	118,850	30,277	82,896	146,450	27,432	64,634	114,470
26,557	66,702	118,930	30,326	83,108	146,830	27,451	64,555	114,290
26,573	66,777	119,070	30,352	83,284	147,130	27,480	64,728	114,570
26,581	66,816	119,190	30,378	83,412	147,340	27,522	65,039	115,110
26,589	66,889	119,350	30,417	83,600	147,670	27,565	65,297	115,580
26,601	66,905	119,360	30,475	83,861	148,120	27,629	65,623	116,150
26,619	66,837	119,170	30,562	84,214	148,710	27,725	66,093	116,960
26,646	66,895	119,240	30,693	84,966	150,030	27,821	66,526	117,700
26,686	66,964	119,350	30,824	85,627	151,180	27,966	67,159	118,790
26,747	67,081	119,550	31,020	86,562	152,870	28,182	68,056	120,370
26,838	67,327	120,010	31,216	87,407	154,390	28,398	68,955	121,940
26,975	67,629	120,530	31,319	87,761	154,970	28,722	70,307	124,350
27,046	67,566	120,390	31,355	88,035	155,470	28,758	70,487	124,670
27,055	67,520	120,410	31,391	88,211	155,780	28,794	70,615	124,900
27,064	67,576	120,540	31,445	88,447	156,190	28,848	70,875	125,360
27,077	67,603	120,560	31,526	88,778	156,780	28,928	71,243	125,990
27,082	67,576	120,560	31,648	89,397	157,910	29,049	71,791	126,940
27,087	67,578	120,590	31,770	90,024	159,000	29,230	72,595	128,340
27,095	67,602	120,620	31,892	90,639	160,100	29,501	73,685	130,180
27,100	67,603	120,630	32,074	91,515	161,590	29,596	74,028	130,800
27,105	67,603	120,640	32,348	92,718	163,660	29,691	74,380	131,440
27,112	67,561	120,540	32,622	94,102	166,130	29,834	74,885	132,330
27,123	67,432	120,260	32,672	94,247	166,400	30,048	75,447	133,420
27,140	67,240	119,820	32,722	94,413	166,710	30,262	76,414	135,110
27,166	67,234	119,740	32,798	94,679	167,220	30,583	77,764	137,550
27,203	67,227	119,700	32,911	95,109	168,020	30,622	77,928	137,850
27,260	67,170	119,580	32,996	95,469	168,620	30,661	78,107	138,170
27,346	67,172	119,580	33,081	95,863	169,310	30,720	78,347	138,600
27,474	67,451	120,020	33,208	96,454	170,350	30,751	78,473	138,810
27,602	67,580	120,240	33,399	97,345	171,960	30,782	78,568	138,980
27,730	67,595	120,250	33,590	98,183	173,500	30,828	78,781	139,350
27,775	67,733	120,540	33,877	99,556	175,920	30,898	79,073	139,850

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
27,791	67,781	120,680	34,002	99,997	176,620	31,002	79,551	140,650
27,807	67,887	120,890	34,045	100,220	177,030	31,107	79,968	141,370
27,822	67,951	121,000	34,089	100,380	177,300	31,264	80,587	142,440
27,838	68,068	121,220	34,155	100,660	177,790	31,279	80,575	142,420
27,843	68,019	121,190	34,253	101,100	178,600	31,294	80,670	142,590
27,848	68,076	121,330	34,351	101,540	179,450	31,317	80,760	142,730
27,853	68,127	121,430	34,499	102,030	180,380	31,351	80,862	142,920
27,858	68,180	121,530	34,720	102,720	181,700	31,402	80,951	143,110
27,865	68,249	121,640	34,748	102,860	181,940	31,479	81,165	143,550
27,870	68,299	121,740	34,775	102,980	182,140	31,594	81,494	144,220
27,897	67,803	120,670	34,815	103,150	182,430	31,709	81,879	144,860
27,925	68,240	121,430	34,876	103,440	182,930	31,881	82,642	146,200
27,966	68,731	122,270	34,968	103,850	183,650	31,972	82,996	146,800
28,028	69,194	123,050	35,105	104,470	184,780	32,004	83,148	147,070
28,061	69,460	123,510	35,242	105,110	185,930	32,036	83,263	147,260
28,093	69,834	124,120	35,448	106,110	187,650	32,083	83,474	147,640
28,142	70,303	124,850	35,554	106,610	188,480	32,108	83,598	147,870
28,215	70,809	125,660	35,591	106,770	188,800	32,133	83,693	148,040
28,325	71,542	126,860	35,628	106,860	188,980	32,171	83,836	148,310
28,364	71,757	127,200	35,684	107,080	189,380	32,227	84,072	148,750
28,402	71,845	127,340	35,767	107,410	189,960	32,311	84,401	149,330
28,460	72,092	127,760	35,850	107,770	190,580	32,438	84,923	150,260
28,517	72,477	128,420	35,975	108,240	191,400	32,482	85,102	150,570
28,604	73,050	129,400	36,100	108,780	192,370	32,526	85,272	150,860
28,628	73,221	129,690	36,288	109,500	193,680	32,593	85,531	151,330
28,652	73,390	129,970	36,475	109,720	194,200	32,627	85,666	151,570
28,688	73,638	130,380	36,574	110,070	194,810	32,662	85,791	151,810
28,742	74,001	130,960	36,672	110,530	195,600	32,715	86,003	152,190
28,796	74,291	131,460	36,820	111,280	196,870	32,793	86,345	152,780
28,877	74,912	132,590	37,041	112,360	198,790	32,911	86,800	153,600
28,958	75,479	133,600	37,263	113,320	200,530	33,028	87,194	154,270
29,080	76,497	135,360	37,360	113,840	201,430	33,205	87,641	155,110
29,171	77,243	136,670	37,457	114,200	202,040	33,469	88,543	156,730
29,262	77,957	137,940	37,602	114,810	203,060	33,734	89,583	158,560
29,399	78,882	139,560	37,748	115,450	204,150	33,783	89,771	158,890
29,482	79,516	140,640	37,966	116,320	205,670	33,832	89,952	159,220
29,512	79,730	141,040	38,294	117,000	206,970	33,904	90,256	159,760
29,522	79,507	140,670	38,351	116,890	206,830	33,977	90,567	160,300
29,532	79,555	140,760	38,409	116,880	206,860	34,087	90,998	161,040
29,537	79,528	140,730	38,495	117,370	207,740	34,196	91,439	161,790
29,555	79,742	141,090	38,624	118,060	208,950	34,360	92,071	162,880

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
29,574	79,927	141,410	38,817	118,980	210,630	34,525	92,681	163,970
29,602	80,313	142,050	39,011	120,020	212,400	34,771	93,463	165,430
29,643	80,689	142,730	39,204	120,880	213,890	35,017	93,689	165,940
29,706	81,196	143,660	39,471	122,020	215,860	35,048	93,798	166,120
29,768	81,617	144,420	39,520	122,160	216,080	35,079	93,886	166,270
29,830	82,052	145,170	39,569	122,320	216,350	35,125	94,064	166,580
29,924	82,774	146,420	39,642	122,630	216,870	35,195	94,329	167,040
30,017	83,401	147,520	39,752	122,940	217,430	35,300	94,812	167,910
30,158	84,209	148,930	39,917	122,850	217,400	35,404	95,258	168,700
30,368	85,427	151,080	40,164	122,900	217,680	35,561	95,875	169,780
30,442	85,651	151,480	40,210	122,990	217,860	35,717	96,515	170,910
30,467	85,903	151,940	40,255	123,180	218,180	35,746	96,606	171,060
30,493	86,018	152,170	40,323	123,580	218,840	35,775	96,653	171,140
30,532	86,220	152,510	40,425	124,200	219,930	35,818	96,845	171,460
30,570	86,448	152,880	40,528	124,690	220,800	35,883	97,150	171,990
30,628	86,804	153,460	40,681	125,650	222,460	35,980	97,542	172,650
30,649	86,877	153,600	40,749	126,100	223,240	36,126	98,114	173,630
30,669	87,036	153,870	40,817	126,400	223,730	36,271	98,580	174,450
30,678	86,883	153,590	40,919	126,880	224,540	36,490	99,310	175,710
30,688	86,976	153,770	41,021	127,140	224,950	36,566	99,219	175,610
30,702	87,131	154,050	41,174	127,750	226,040	36,643	99,266	175,770
30,724	87,241	154,220	41,404	128,420	227,230	36,758	99,063	175,540
30,756	87,608	154,800	41,446	128,170	226,820	36,798	99,195	175,780
30,804	87,896	155,310	41,488	127,830	226,230	36,838	99,303	175,980
30,876	88,361	156,140	41,551	127,660	225,980	36,898	99,550	176,440
30,948	88,698	156,740	41,646	127,500	225,750	36,989	99,948	177,170
31,056	89,477	158,150	41,788	128,090	226,760	37,079	100,300	177,800
31,107	89,769	158,700	41,931	128,720	227,840	37,215	100,980	178,980
31,159	90,088	159,280	42,144	130,060	230,150	37,284	101,230	179,420
31,235	90,624	160,230	42,207	130,190	230,350	37,315	101,370	179,650
31,312	91,037	160,970	42,270	130,570	230,980	37,346	101,460	179,800
31,427	91,723	162,160	42,364	131,040	231,780	37,393	101,600	180,040
31,570	92,633	163,780	42,505	131,590	232,720	37,463	101,850	180,470
31,621	92,859	164,180	42,646	132,240	233,890	37,568	102,270	181,220
31,638	92,630	163,810	42,857	132,460	234,300	37,725	102,860	182,200
31,656	92,864	164,220	42,926	132,120	233,740	37,883	103,550	183,430
31,665	92,629	163,810	42,996	131,550	232,820	38,119	104,260	184,680
31,674	92,658	163,880	43,099	131,650	233,080	38,162	104,350	184,810
31,679	92,271	163,240	43,203	131,970	233,720	38,181	104,350	184,820
31,684	92,381	163,480	43,359	132,860	235,270	38,199	104,430	184,950
31,746	93,158	164,680	43,515	133,530	236,390	38,227	104,260	184,670

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
31,767	93,080	164,560	43,574	133,660	236,570	38,269	104,270	184,700
31,780	93,141	164,660	43,634	133,960	237,090	38,332	104,210	184,630
31,793	93,310	164,960	43,723	134,250	237,540	38,426	104,360	184,870
31,812	93,559	165,390	43,857	134,650	238,210	38,476	104,090	184,410
31,841	93,857	165,880	44,045	135,510	239,760	38,525	104,260	184,720
31,885	94,110	166,310	44,122	135,580	239,940	38,599	104,490	185,140
31,950	94,486	166,960	44,199	135,270	239,450	38,711	104,990	186,040
32,048	94,970	167,790	44,314	134,950	238,990	38,822	105,440	186,850
32,146	95,517	168,740	44,487	135,330	239,690	38,880	105,730	187,350
32,292	96,159	169,940	44,659	136,280	241,340	38,939	106,020	187,860
32,323	96,300	170,240	44,832	137,060	242,660	39,026	106,340	188,410
32,354	96,436	170,510	45,021	137,800	243,960	39,114	106,650	188,930
32,400	96,650	170,920	45,209	138,300	244,800	39,245	107,140	189,770
32,470	96,949	171,490	45,402	138,570	245,320	39,443	107,850	190,980
32,574	97,434	172,330	45,503	138,230	244,840	39,512	108,210	191,620
32,730	98,362	173,860	45,605	138,160	244,800	39,581	108,470	192,070
32,887	99,284	175,490	45,757	138,500	245,440	39,684	108,880	192,810
32,969	99,760	176,330	45,985	139,370	246,950	39,839	109,200	193,430
33,051	100,320	177,370	46,064	139,600	247,330	39,894	109,070	193,240
33,174	101,080	178,780	46,143	139,790	247,670	39,948	109,100	193,330
33,359	102,070	180,480	46,178	139,830	247,740	40,030	109,210	193,570
33,543	102,930	182,000	46,191	139,780	247,660	40,111	108,880	193,020
33,577	103,080	182,290	46,204	139,810	247,750	40,233	109,020	193,280
33,611	103,220	182,570	46,223	139,680	247,500	40,417	109,750	194,590
33,662	103,440	182,970	46,251	139,590	247,330	40,600	110,640	196,150
33,738	103,810	183,590	46,293	139,780	247,690	40,875	111,750	198,060
33,853	104,200	184,240	46,357	140,060	248,200	40,937	111,790	198,110
33,967	104,820	185,300	46,453	140,420	248,830	40,998	112,030	198,540
34,082	105,350	186,270	46,596	140,910	249,640	41,090	112,350	199,120
34,142	105,550	186,670	46,739	140,850	249,590	41,227	112,940	200,200
34,202	105,680	186,990	46,789	140,800	249,540	41,434	113,220	200,690
34,292	106,110	187,840	46,839	140,800	249,570	41,641	112,970	200,410
34,427	106,890	189,260	46,915	140,980	249,920	41,679	112,770	200,100
34,563	107,600	190,480	47,028	141,240	250,410	41,717	112,820	200,230
34,765	108,720	192,400	47,197	141,950	251,650	41,774	113,020	200,590
34,818	108,740	192,470	47,366	142,890	253,280	41,859	113,260	201,010
34,870	109,270	193,390	47,394	142,930	253,360	41,988	113,790	201,920
34,949	109,750	194,280	47,422	142,990	253,490	42,024	113,900	202,110
35,027	110,220	195,090	47,464	143,160	253,790	42,060	113,970	202,190
35,145	110,860	196,210	47,527	143,320	254,100	42,115	114,240	202,650
35,322	111,710	197,640	47,622	143,580	254,590	42,197	114,520	203,100

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
35,499	112,470	199,050	47,763	143,860	255,150	42,319	115,100	204,130
35,532	112,580	199,250	47,967	144,420	256,130	42,503	115,870	205,520
35,564	112,680	199,420	48,171	144,090	255,650	42,687	116,330	206,360
35,613	112,800	199,660	48,278	144,150	255,840	42,721	116,360	206,400
35,686	113,160	200,320	48,384	144,430	256,370	42,755	116,330	206,390
35,796	113,740	201,360	48,545	145,100	257,530	42,805	116,260	206,270
35,905	114,130	202,060	48,705	145,910	258,930	42,882	116,230	206,260
36,070	114,600	202,940	48,945	146,860	260,630	42,921	116,130	206,120
36,234	115,570	204,710	48,987	146,950	260,800	42,961	115,900	205,760
36,321	116,100	205,700	49,029	147,080	261,000	43,021	115,980	205,930
36,351	116,270	206,000	49,092	147,350	261,480	43,111	115,800	205,670
36,381	116,410	206,260	49,187	147,610	261,950	43,246	116,290	206,530
36,426	116,620	206,620	49,329	147,920	262,510	43,381	116,820	207,430
36,494	116,960	207,190	49,471	148,110	262,860	43,583	117,650	208,850
36,537	117,160	207,550	49,684	148,130	262,960	43,812	118,450	210,260
36,580	117,350	207,890	49,896	147,940	262,750	44,055	118,980	211,220
36,644	117,700	208,470	50,000	148,150	263,140	44,094	118,950	211,150
36,741	118,190	209,370				44,133	118,850	210,990
36,837	118,720	210,300				44,191	118,560	210,510
36,982	119,510	211,680				44,278	118,200	209,940
37,199	120,580	213,540				44,409	118,420	210,390
37,416	121,430	214,970				44,606	119,190	211,750
37,455	121,520	215,140				44,802	119,860	212,880
37,495	121,620	215,380				44,878	120,000	213,140
37,555	121,900	215,930				44,953	120,220	213,520
37,645	122,230	216,530				45,067	120,530	214,070
37,734	122,330	216,770				45,237	120,790	214,560
37,869	122,720	217,530				45,407	120,980	214,930
38,071	124,040	219,810				45,663	120,790	214,780
38,131	124,380	220,440				45,918	121,500	216,020
38,192	124,690	220,980				45,944	121,540	216,050
38,282	125,070	221,680				45,969	121,600	216,130
38,373	125,560	222,570				46,007	121,790	216,450
38,509	126,310	223,900				46,064	122,020	216,870
38,579	126,650	224,520				46,150	122,240	217,250
38,649	126,950	225,030				46,278	122,510	217,780
38,754	127,570	226,150				46,471	122,980	218,640
38,859	128,130	227,130				46,726	123,180	219,040
39,017	128,830	228,330				46,757	123,080	218,880
39,253	129,710	229,810				46,788	122,810	218,440
39,324	129,960	230,230				46,835	122,690	218,260

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
39,396	130,190	230,600				46,905	122,800	218,480
39,503	130,290	230,820				46,975	122,960	218,780
39,663	130,780	231,850				47,080	123,230	219,290
39,824	131,680	233,450				47,186	123,650	220,030
40,064	133,270	236,140				47,241	123,950	220,540
40,102	133,460	236,450				47,296	124,210	220,990
40,139	133,660	236,780				47,379	124,490	221,500
40,195	133,860	237,120				47,503	124,890	222,250
40,278	134,180	237,660				47,628	125,200	222,860
40,404	134,940	239,100				47,814	125,530	223,510
40,530	135,660	240,420				47,908	125,620	223,650
40,718	136,640	242,100				48,002	125,710	223,820
41,001	137,430	243,540				48,143	125,390	223,320
41,100	136,940	242,770				48,284	125,370	223,340
41,198	136,950	242,870				48,496	125,940	224,390
41,347	137,940	244,630				48,707	126,900	226,030
41,495	139,030	246,480				48,765	127,110	226,400
41,552	139,340	246,980				48,823	127,230	226,610
41,577	139,450	247,190				48,910	127,450	227,010
41,602	139,510	247,330				48,997	127,590	227,290
41,616	139,390	247,130				49,127	127,860	227,820
41,629	139,410	247,190				49,257	128,100	228,290
41,649	139,380	247,160				49,453	128,340	228,750
41,679	139,520	247,410				49,746	128,370	228,880
41,723	139,710	247,750				50,000	128,620	229,390
41,790	139,810	247,920						
41,891	140,510	249,140						
41,992	141,080	250,170						
42,143	141,940	251,650						
42,294	142,400	252,410						
42,445	142,520	252,730						
42,671	143,190	254,050						
42,898	144,620	256,540						
42,956	144,710	256,710						
43,014	145,020	257,270						
43,101	145,180	257,470						
43,232	145,880	258,780						
43,362	146,360	259,600						
43,556	146,680	260,140						
43,750	146,350	259,720						
43,852	146,880	260,690						

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
43,954	147,420	261,690						
44,106	148,340	263,290						
44,274	149,050	264,470						
44,442	149,560	265,340						
44,637	150,020	266,210						
44,831	150,110	266,420						
45,123	151,230	268,340						
45,226	151,620	269,100						
45,261	151,760	269,360						
45,297	151,850	269,520						
45,351	152,090	269,950						
45,373	152,160	270,070						
45,396	152,270	270,270						
45,430	152,390	270,490						
45,481	152,530	270,720						
45,557	152,790	271,140						
45,633	153,020	271,480						
45,748	153,380	272,070						
45,862	153,490	272,240						
46,034	153,310	272,040						
46,291	153,980	273,290						
46,381	154,470	274,100						
46,471	154,830	274,730						
46,606	155,570	276,030						
46,742	156,030	276,880						
46,943	156,540	277,820						
47,144	156,770	278,160						
47,250	156,710	278,010						
47,287	156,650	277,950						
47,324	156,660	278,010						
47,380	156,880	278,420						
47,463	157,270	279,130						
47,546	157,770	279,980						
47,671	158,320	280,920						
47,858	159,410	282,760						
48,046	160,360	284,450						
48,246	160,830	285,470						
48,504	160,580	285,120						
48,603	160,690	285,300						
48,701	160,790	285,500						
48,849	161,390	286,580						

Tabel C.4 (Lanjutan)

$\Psi = 90^\circ$			$\Psi = 105^\circ$			$\Psi = 120^\circ$		
u	τ	σ_{eq}	u	τ	σ_{eq}	u	τ	σ_{eq}
49,071	162,690	288,810						
49,293	163,850	290,840						
49,399	164,260	291,600						
49,506	164,580	292,200						
49,665	165,140	293,270						
49,693	165,280	293,510						
49,721	165,320	293,600						
49,763	165,360	293,680						
49,826	165,490	293,920						
49,888	165,560	294,060						
49,944	165,510	293,980						
50,000	165,650	294,190						

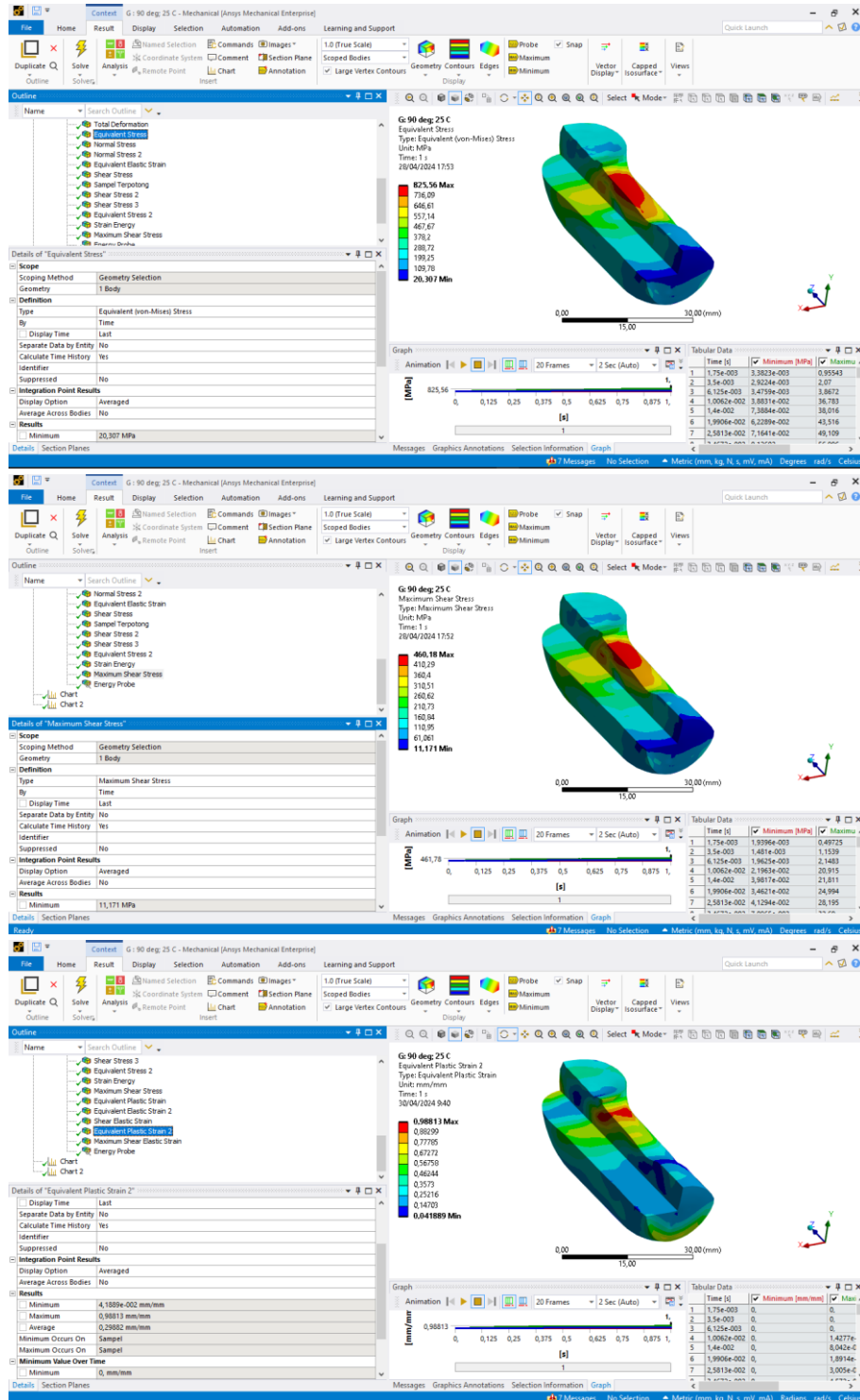
Ψ = Sudut *Channel*

u = *Displacement* (mm)

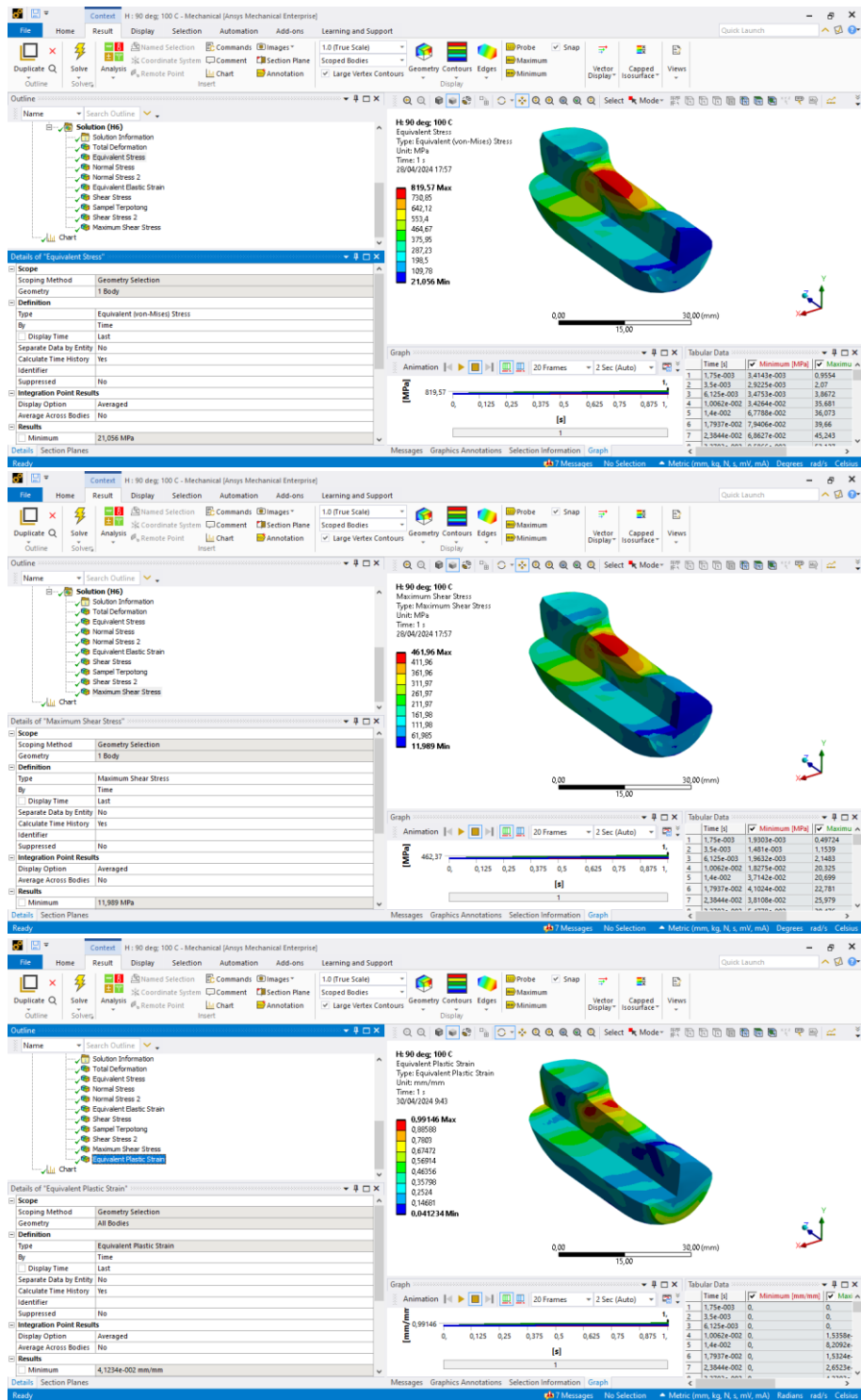
σ_{eq} = Tegangan Ekuivalen Rata-rata (MPa)

τ = Tegangan geser Maksimum (MPa)

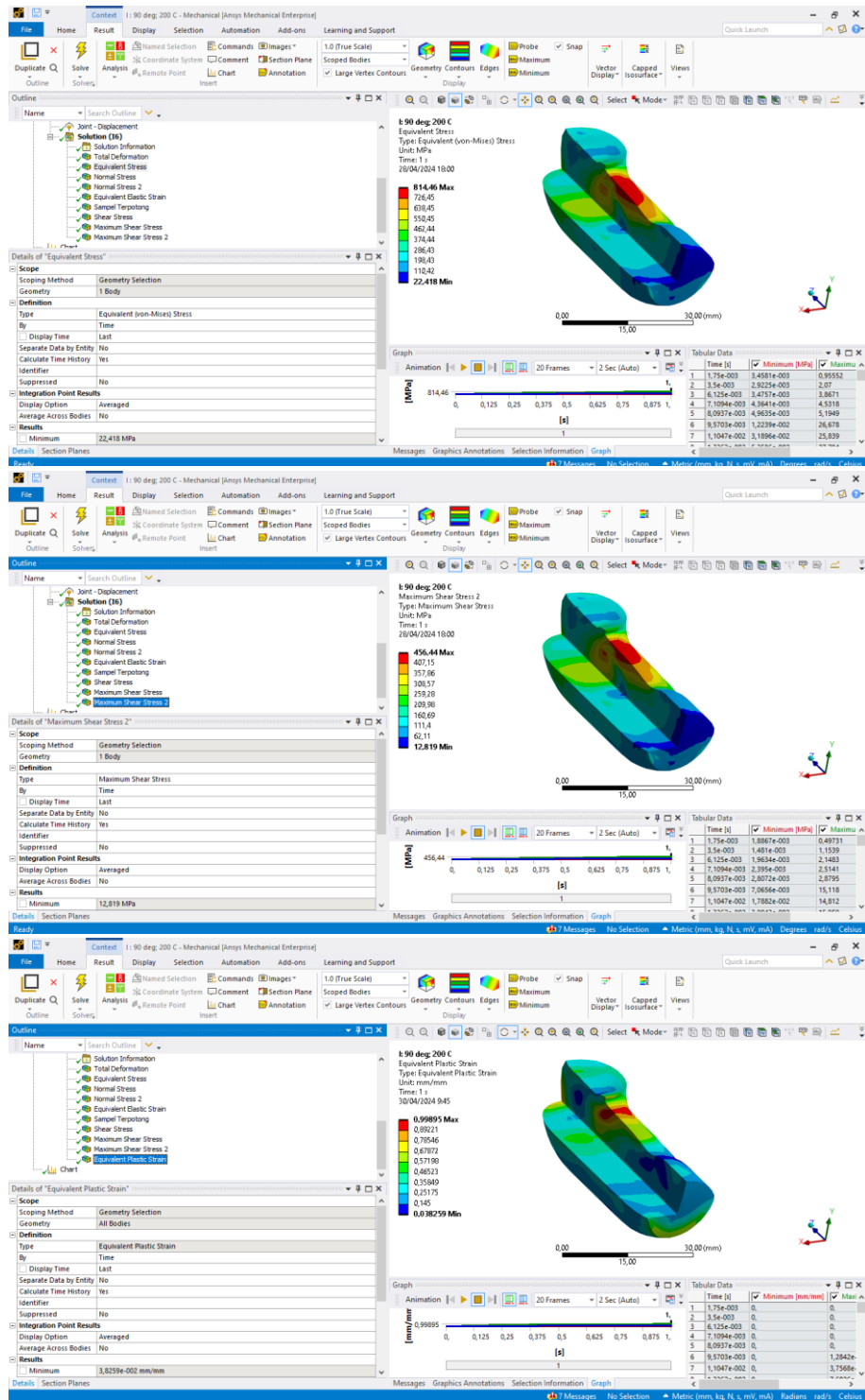
C.2 Gambar Hasil Simulasi



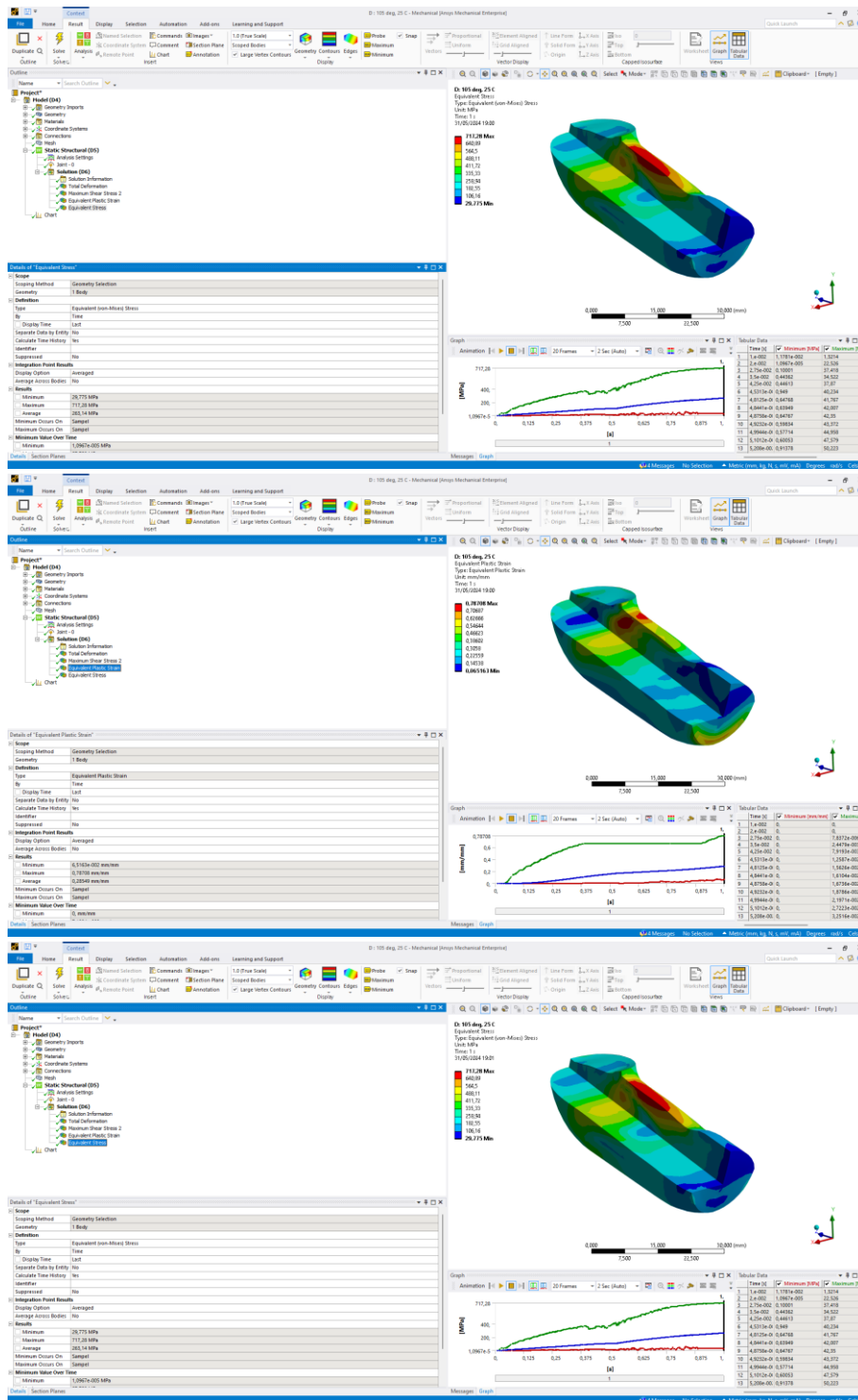
Gambar C.1 Hasil Simulasi ECAP Sudut Channel 90° dengan Temperatur Penekanan 25°C



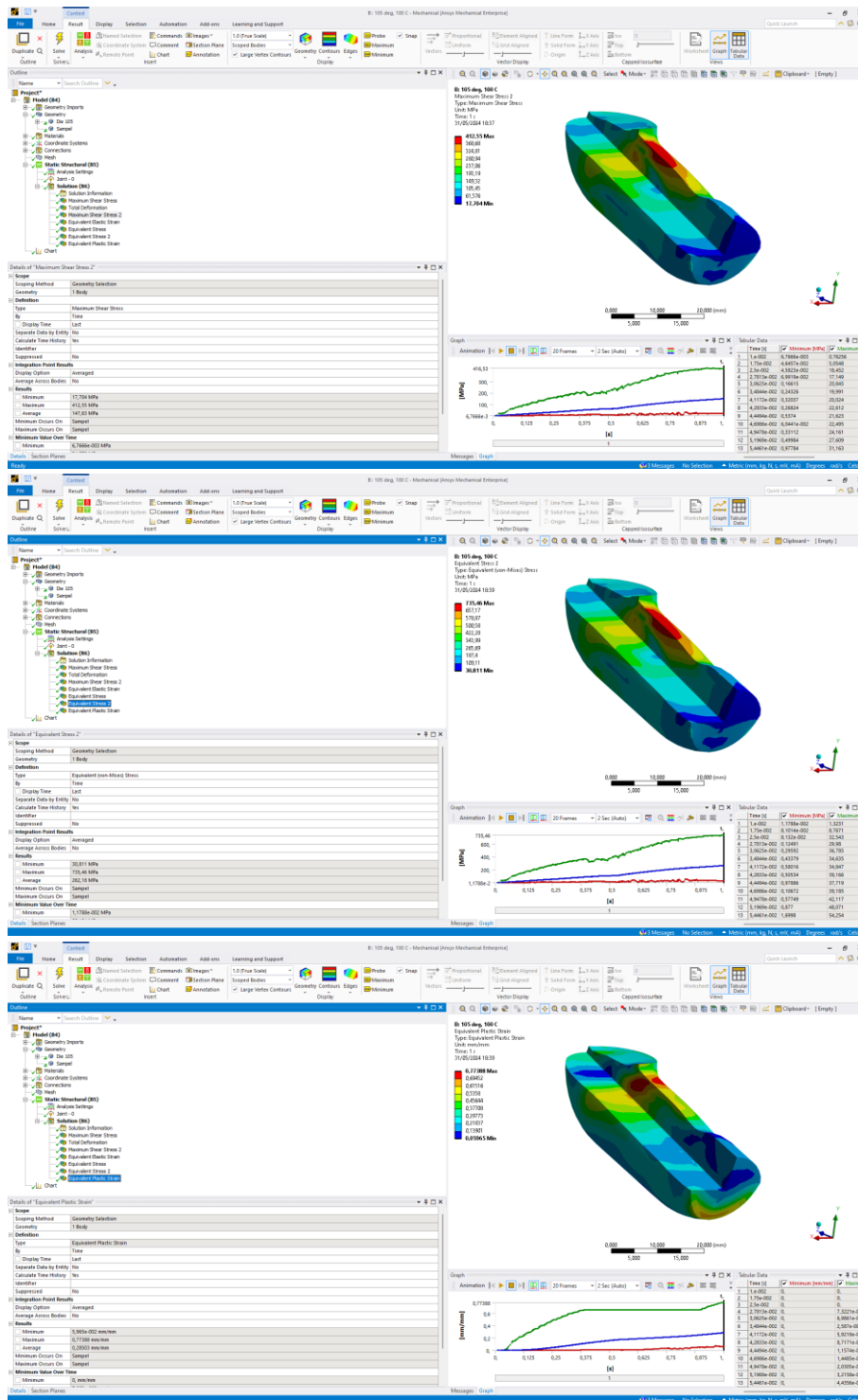
Gambar C.2 Hasil Simulasi ECAP Sudut *Channel* 90° dengan Temperatur Penekanan 100°C



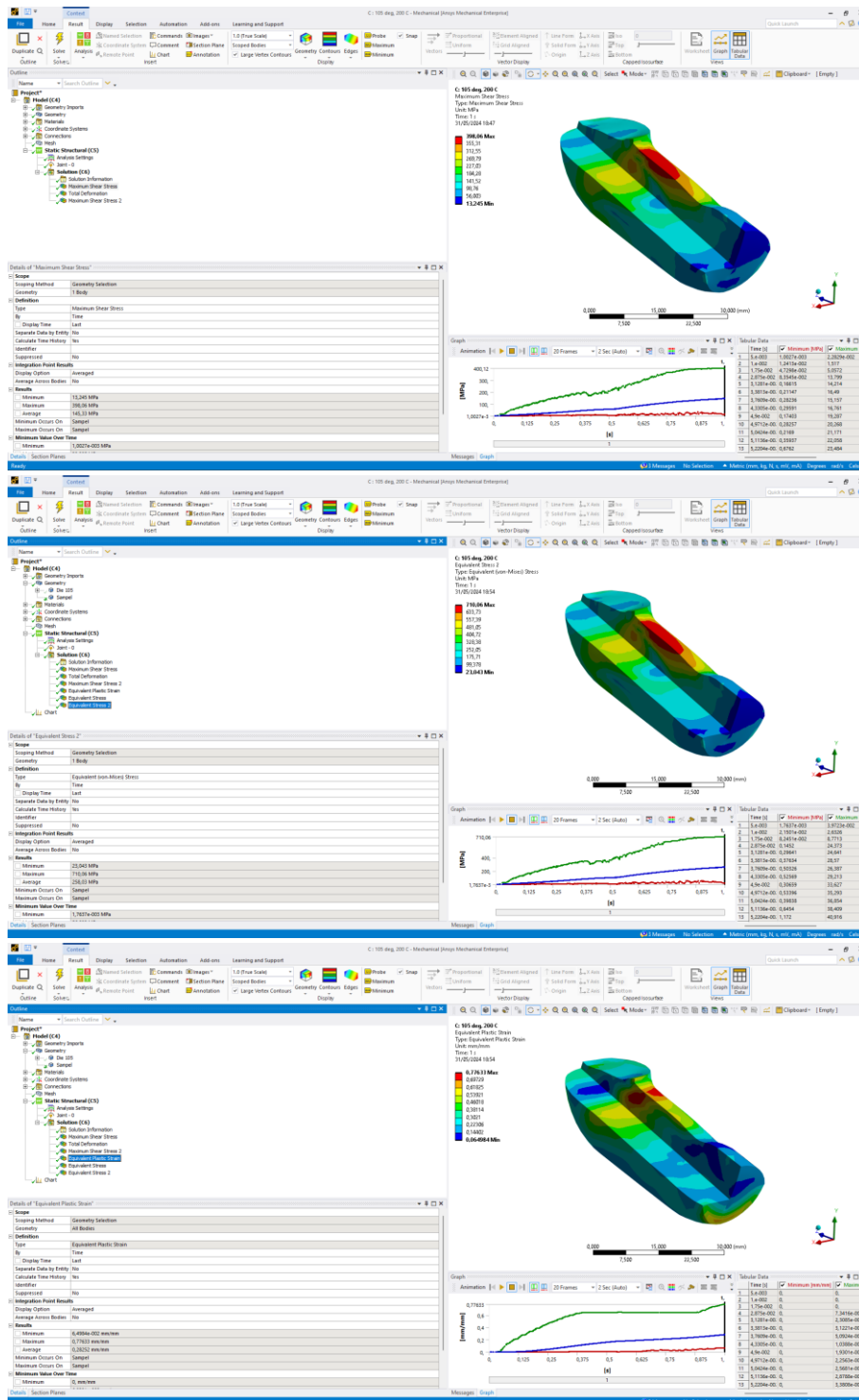
Gambar C.3 Hasil Simulasi ECAP Sudut Channel 90° dengan Temperatur Penekanan 200°C



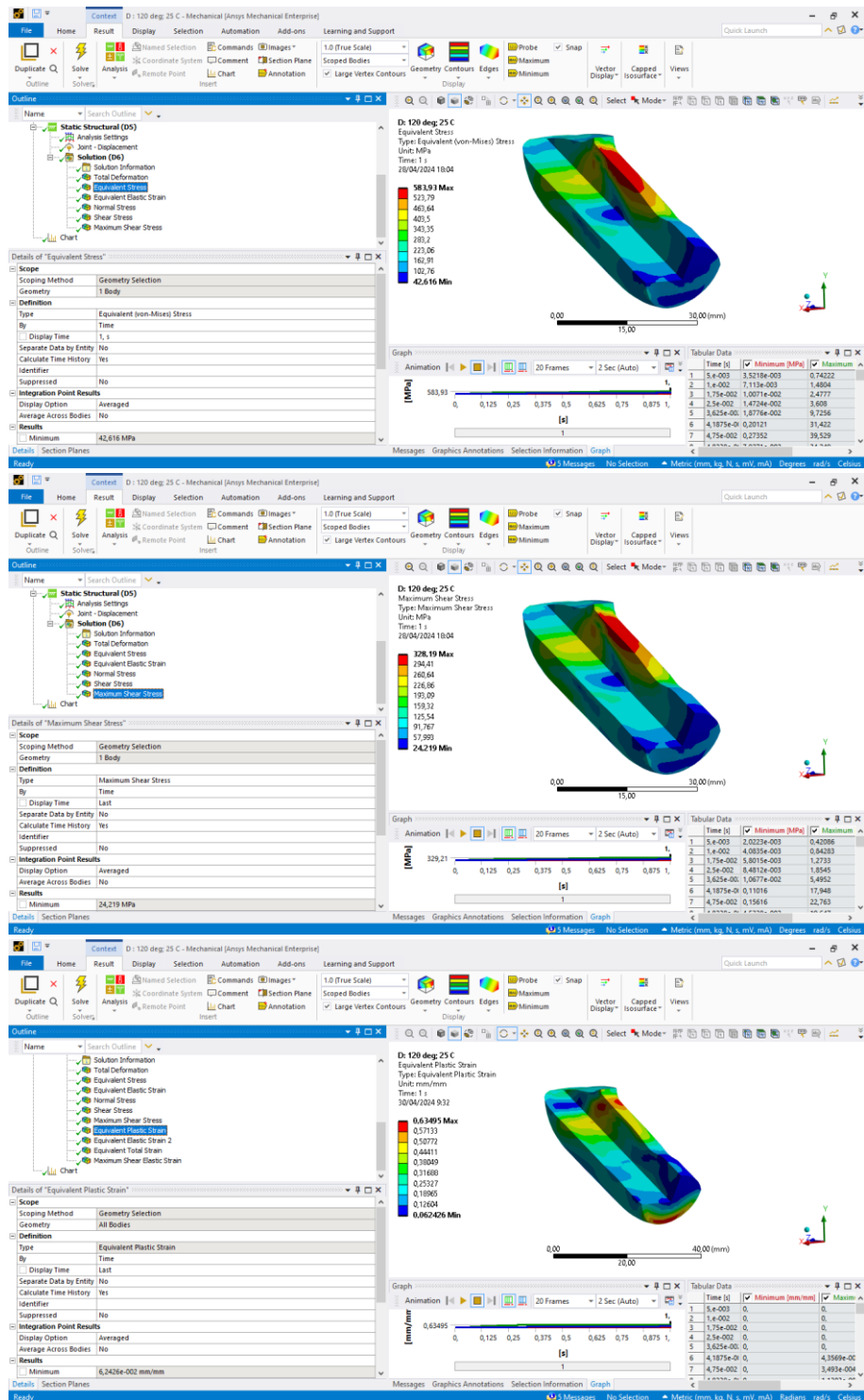
Gambar C.4 Hasil Simulasi ECAP Sudut *Channel* 105° dengan Temperatur Penekanan 25°C



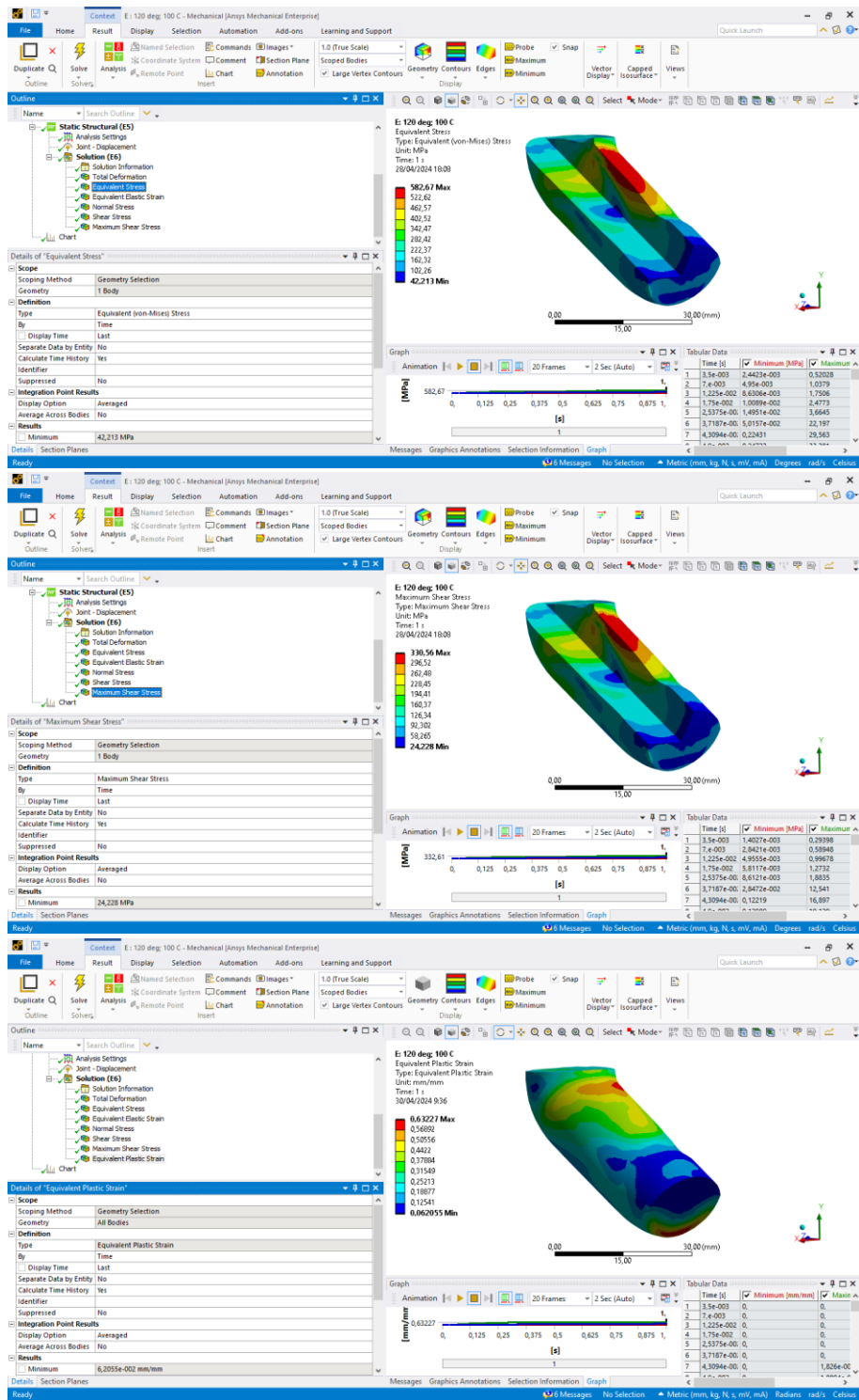
Gambar C.5 Hasil Simulasi ECAP Sudut Channel 105° dengan Temperatur Penekanan 100°C



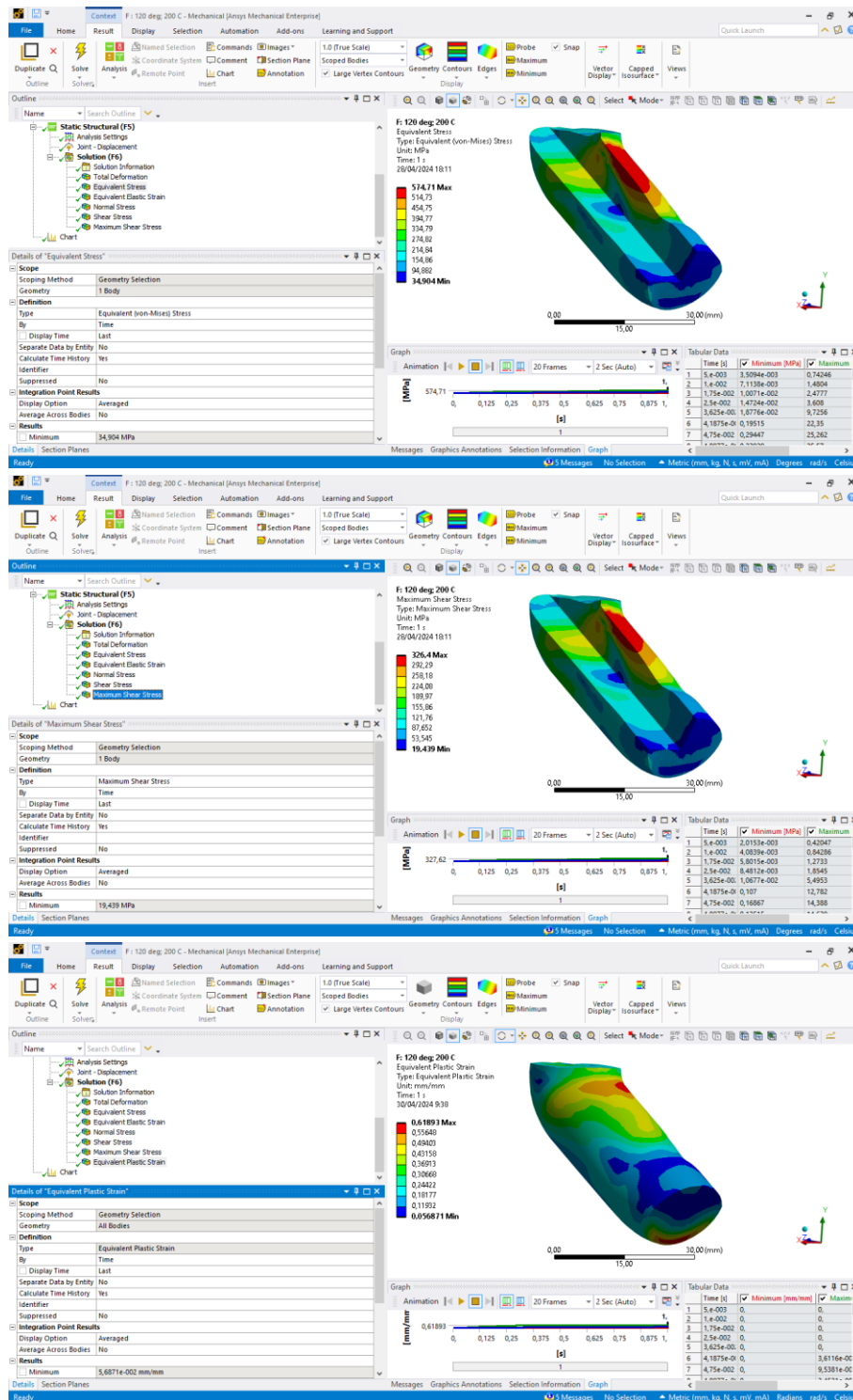
Gambar C.6 Hasil Simulasi ECAP Sudut Channel 105° dengan Temperatur Penekanan 200°C



Gambar C.7 Hasil Simulasi ECAP Sudut Channel 120° dengan Temperatur Penekanan 25°C



Gambar C.8 Hasil Simulasi ECAP Sudut Channel 120° dengan Temperatur Penekanan 100°C



Gambar C.9 Hasil Simulasi ECAP Sudut $Channel\ 120^\circ$ dengan Temperatur Penekanan $200^\circ C$