

## DAFTAR PUSTAKA

- Bai, Y. 2003. *Marine Structural Design*. Elsevier
- BKI, Vol. II. 2020. *Guidelines for Hull Structures and Ship Equipment*. Jakarta, Indonesia.
- Choiruddin *et al.* 2015. *Analisa Fatigue Crude Oil Tanker 306507 DWT berdasarkan Common Structural Rules (CSR) Oil Tanker*. Universitas Diponegoro. Semarang
- Clearseas.org (2018. 08 Juni). *Double Hulls*, Diakses pada 06 Januari 2020, dari <http://www.maritimeworld.web.id/2011/04/apa-yang-dimaksud-dengan-double-hulls.html>
- DNV GL. 2017a. *Rules for Classification: Ships, Pt.3 Ch.4. Loads*. Norway.
- DNV GL. 2017b. *Rules for Classification: Ships, Pt.3 Ch.5. Hull Girder Strength*. Norway.
- Hayler, William B. & Keever, John M, 2003. *American Merchant Seaman's Manual*. Centerville, MD. Cornell Maritime Press
- Hughes O.F. & Paik J.K. 2010. *Ship Structural Analysis and Design*. The Society of Naval Architects and Marine Engineers-SNAME, New Jersey.
- MARPOL. 1978. *International Convention for the Prevention of Pollution from Ships, 1973*, as modified by the Protocol of 1978.
- Marine Safety. 2004, *Standards for the Double Hull Construction of Oil Tankers*, as revised 2004
- Maritimeworld.com. (2011. 01 April). Apa yang dimaksud dengan Double-hulls Kapal. Diakses pada 15 Desember 2019, dari

<http://www.maritimeworld.web.id/2011/04/apa-yang-dimaksud-dengan-double-hulls.html>

Muis Alie, M.Z. 2016. *Residual Strength Analysis of Asymmetrically Damaged Ship Hull Girder using Beam Finite Element Method*. Makara J. Technol. 20/1 (2016), 7-12.

Muis Alie, M.Z. 2018. *Simplified Approach on the Ultimate Hull Girder Strength of Asymmetrically Damaged Ships*. International Journal of Offshore and Polar Engineering (ISSN 1053-5381).

Muis Alie, M.Z. *et al.* 2019. Perhitungan Kekuatan Kapal dengan Metode Elemen Hingga, Yogyakarta.

U.S. Energy Information Administration. 2014. *Oil tanker sizes range from general purpose to ultra-large crude carriers on AFRA scale*, London Tanker Brokers' Panel

Shama, M. 2013. *Buckling of Ship Structures*. Springer, Verlag Berlin Heidelberg.

Tupper, E. C. 2004. *Introduction to Naval Architecture Fourth Edition*. Elsevier.

Van-Vu, Huunh. 2005. *Prediction The Ultimate Strength of intact Ship by Finite Element Method*. International Journal of Mechanical Engineering and Applications (IJMEA).

Wiltshire, Andrew, 2008. *Looking Back at Classic Tankers*. Bristol, England: Bernard McCall

Zainuri, M. 2008. Kekuatan Bahan. Yogyakarta.

## **LAMPIRAN**

Lampiran 1. Tabel Data Double-Hull Tanker T3 Kondisi Hogging

T3 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.00E-02	3.20E-06	1	1.60E-10	1.54E+10	0.00E+00	5.50E-04	8.09E-05	-1.94E+06	2.87E+06	5.58E+04
2.00E-02	4.00E-06	2	2.00E-10	2.96E+10	0.00E+00	1.10E-03	1.62E-04	-3.88E+06	5.75E+06	1.12E+05
3.00E-02	8.00E-06	3	4.00E-10	4.52E+10	0.00E+00	1.65E-03	2.43E-04	-5.82E+06	8.62E+06	1.68E+05
4.00E-02	1.20E-05	4	6.00E-10	6.08E+10	0.00E+00	2.20E-03	3.24E-04	-7.75E+06	1.15E+07	2.23E+05
5.00E-02	1.60E-05	5	8.00E-10	7.64E+10	0.00E+00	2.75E-03	4.04E-04	-9.69E+06	1.44E+07	2.79E+05
6.00E-02	2.00E-05	6	1.00E-09	9.20E+10	0.00E+00	3.30E-03	4.85E-04	-1.16E+07	1.72E+07	3.35E+05
7.00E-02	2.40E-05	7	1.20E-09	1.08E+11	0.00E+00	3.85E-03	5.66E-04	-1.36E+07	2.01E+07	3.91E+05
8.00E-02	2.80E-05	8	1.40E-09	1.23E+11	0.00E+00	4.40E-03	6.47E-04	-1.55E+07	2.30E+07	4.47E+05
9.00E-02	3.20E-05	9	1.60E-09	1.38E+11	0.00E+00	4.95E-03	7.28E-04	-1.74E+07	2.59E+07	5.03E+05
0.1	3.60E-05	10	1.80E-09	1.54E+11	0.00E+00	5.50E-03	8.09E-04	-1.94E+07	2.87E+07	5.58E+05
0.11	4.00E-05	11	2.00E-09	1.69E+11	0.00E+00	6.05E-03	8.90E-04	-2.13E+07	3.16E+07	6.14E+05
0.12	4.40E-05	12	2.20E-09	1.85E+11	0.00E+00	6.60E-03	9.71E-04	-2.33E+07	3.45E+07	6.70E+05
0.13	4.40E-05	13	2.20E-09	2.00E+11	0.00E+00	7.15E-03	1.05E-03	-2.52E+07	3.74E+07	7.26E+05
0.14	4.80E-05	14	2.40E-09	2.15E+11	0.00E+00	7.69E-03	1.13E-03	-2.71E+07	4.02E+07	7.82E+05
0.15	5.20E-05	15	2.60E-09	2.31E+11	0.00E+00	8.24E-03	1.21E-03	-2.91E+07	4.31E+07	8.38E+05
0.16	5.60E-05	16	2.80E-09	2.46E+11	0.00E+00	8.79E-03	1.29E-03	-3.10E+07	4.60E+07	8.94E+05
0.17	6.00E-05	17	3.00E-09	2.61E+11	0.00E+00	9.34E-03	1.38E-03	-3.30E+07	4.89E+07	9.49E+05
0.18	6.40E-05	18	3.20E-09	2.77E+11	0.00E+00	9.89E-03	1.46E-03	-3.49E+07	5.17E+07	1.01E+06
0.19	6.80E-05	19	3.40E-09	2.92E+11	0.00E+00	1.04E-02	1.54E-03	-3.68E+07	5.46E+07	1.06E+06
0.2	7.20E-05	20	3.60E-09	3.08E+11	0.00E+00	1.10E-02	1.62E-03	-3.88E+07	5.75E+07	1.12E+06

T3 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.21	7.60E-05	21	3.80E-09	3.23E+11	0.00E+00	1.15E-02	1.70E-03	-4.07E+07	6.03E+07	1.17E+06
0.22	8.00E-05	22	4.00E-09	3.38E+11	0.00E+00	1.21E-02	1.78E-03	-4.26E+07	6.32E+07	1.23E+06
0.23	8.40E-05	23	4.20E-09	3.54E+11	0.00E+00	1.26E-02	1.86E-03	-4.46E+07	6.61E+07	1.28E+06
0.24	8.80E-05	24	4.40E-09	3.69E+11	0.00E+00	1.32E-02	1.94E-03	-4.65E+07	6.90E+07	1.34E+06
0.25	9.20E-05	25	4.60E-09	3.84E+11	0.00E+00	1.37E-02	2.02E-03	-4.85E+07	7.18E+07	1.40E+06
0.26	9.60E-05	26	4.80E-09	4.00E+11	0.00E+00	1.43E-02	2.10E-03	-5.04E+07	7.47E+07	1.45E+06
0.27	9.60E-05	27	4.80E-09	4.15E+11	0.00E+00	1.48E-02	2.18E-03	-5.23E+07	7.76E+07	1.51E+06
0.28	1.00E-04	28	5.00E-09	4.31E+11	0.00E+00	1.54E-02	2.26E-03	-5.43E+07	8.05E+07	1.56E+06
0.29	1.04E-04	29	5.20E-09	4.46E+11	0.00E+00	1.59E-02	2.35E-03	-5.62E+07	8.33E+07	1.62E+06
0.3	1.08E-04	30	5.40E-09	4.61E+11	0.00E+00	1.65E-02	2.43E-03	-5.82E+07	8.62E+07	1.68E+06
0.31	1.12E-04	31	5.60E-09	4.77E+11	0.00E+00	1.70E-02	2.51E-03	-6.01E+07	8.91E+07	1.73E+06
0.32	1.16E-04	32	5.80E-09	4.92E+11	0.00E+00	1.76E-02	2.59E-03	-6.20E+07	9.20E+07	1.79E+06
0.33	1.20E-04	33	6.00E-09	5.07E+11	0.00E+00	1.81E-02	2.67E-03	-6.40E+07	9.48E+07	1.84E+06
0.34	1.24E-04	34	6.20E-09	5.23E+11	0.00E+00	1.87E-02	2.75E-03	-6.59E+07	9.77E+07	1.90E+06
0.35	1.28E-04	35	6.40E-09	5.38E+11	0.00E+00	1.92E-02	2.83E-03	-6.78E+07	1.01E+08	1.95E+06
0.36	1.32E-04	36	6.60E-09	5.54E+11	0.00E+00	1.98E-02	2.91E-03	-6.98E+07	1.03E+08	2.01E+06
0.37	1.36E-04	37	6.80E-09	5.69E+11	0.00E+00	2.03E-02	2.99E-03	-7.17E+07	1.06E+08	2.07E+06
0.38	1.40E-04	38	7.00E-09	5.84E+11	0.00E+00	2.09E-02	3.07E-03	-7.37E+07	1.09E+08	2.12E+06
0.39	1.44E-04	39	7.20E-09	6.00E+11	0.00E+00	2.14E-02	3.15E-03	-7.56E+07	1.12E+08	2.18E+06
0.4	1.48E-04	40	7.40E-09	6.15E+11	0.00E+00	2.20E-02	3.24E-03	-7.75E+07	1.15E+08	2.23E+06
0.41	1.48E-04	41	7.40E-09	6.30E+11	0.00E+00	2.25E-02	3.32E-03	-7.95E+07	1.18E+08	2.29E+06
0.42	1.52E-04	42	7.60E-09	6.46E+11	0.00E+00	2.31E-02	3.40E-03	-8.14E+07	1.21E+08	2.35E+06
0.43	1.56E-04	43	7.80E-09	6.61E+11	0.00E+00	2.36E-02	3.48E-03	-8.34E+07	1.24E+08	2.40E+06

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Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.44	1.60E-04	44	8.00E-09	6.77E+11	0.00E+00	2.42E-02	3.56E-03	-8.53E+07	1.26E+08	2.46E+06
0.45	1.64E-04	45	8.20E-09	6.92E+11	0.00E+00	2.47E-02	3.64E-03	-8.72E+07	1.29E+08	2.51E+06
0.46	1.68E-04	46	8.40E-09	7.07E+11	0.00E+00	2.53E-02	3.72E-03	-8.92E+07	1.32E+08	2.57E+06
0.47	1.72E-04	47	8.60E-09	7.23E+11	0.00E+00	2.58E-02	3.80E-03	-9.11E+07	1.35E+08	2.62E+06
0.48	1.76E-04	48	8.80E-09	7.38E+11	0.00E+00	2.64E-02	3.88E-03	-9.31E+07	1.38E+08	2.68E+06
0.49	1.80E-04	49	9.00E-09	7.53E+11	0.00E+00	2.69E-02	3.96E-03	-9.50E+07	1.41E+08	2.74E+06
0.5	1.84E-04	50	9.20E-09	7.69E+11	0.00E+00	2.75E-02	4.04E-03	-9.69E+07	1.44E+08	2.79E+06
0.51	1.88E-04	51	9.40E-09	7.84E+11	0.00E+00	2.80E-02	4.13E-03	-9.89E+07	1.47E+08	2.85E+06
0.52	1.92E-04	52	9.60E-09	8.00E+11	0.00E+00	2.86E-02	4.21E-03	-1.01E+08	1.49E+08	2.90E+06
0.53	1.96E-04	53	9.80E-09	8.15E+11	0.00E+00	2.91E-02	4.29E-03	-1.03E+08	1.52E+08	2.96E+06
0.54	2.00E-04	54	1.00E-08	8.30E+11	0.00E+00	2.97E-02	4.37E-03	-1.05E+08	1.55E+08	3.02E+06
0.55	2.00E-04	55	1.00E-08	8.46E+11	0.00E+00	3.02E-02	4.45E-03	-1.07E+08	1.58E+08	3.07E+06
0.56	2.04E-04	56	1.02E-08	8.61E+11	0.00E+00	3.08E-02	4.53E-03	-1.09E+08	1.61E+08	3.13E+06
0.57	2.08E-04	57	1.04E-08	8.76E+11	0.00E+00	3.13E-02	4.61E-03	-1.11E+08	1.64E+08	3.18E+06
0.58	2.12E-04	58	1.06E-08	8.92E+11	0.00E+00	3.19E-02	4.69E-03	-1.12E+08	1.67E+08	3.24E+06
0.59	2.16E-04	59	1.08E-08	9.07E+11	0.00E+00	3.24E-02	4.77E-03	-1.14E+08	1.70E+08	3.30E+06
0.6	2.20E-04	60	1.10E-08	9.23E+11	0.00E+00	3.30E-02	4.85E-03	-1.16E+08	1.72E+08	3.35E+06
0.61	2.24E-04	61	1.12E-08	9.38E+11	0.00E+00	3.35E-02	4.93E-03	-1.18E+08	1.75E+08	3.41E+06
0.62	2.28E-04	62	1.14E-08	9.53E+11	0.00E+00	3.41E-02	5.01E-03	-1.20E+08	1.78E+08	3.46E+06
0.63	2.32E-04	63	1.16E-08	9.69E+11	0.00E+00	3.46E-02	5.10E-03	-1.22E+08	1.81E+08	3.52E+06
0.64	2.36E-04	64	1.18E-08	9.84E+11	0.00E+00	3.52E-02	5.18E-03	-1.24E+08	1.84E+08	3.57E+06
0.65	2.40E-04	65	1.20E-08	1.00E+12	0.00E+00	3.57E-02	5.26E-03	-1.26E+08	1.87E+08	3.63E+06
0.66	2.44E-04	66	1.22E-08	1.01E+12	0.00E+00	3.63E-02	5.34E-03	-1.28E+08	1.90E+08	3.69E+06

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Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.67	2.48E-04	67	1.24E-08	1.03E+12	0.00E+00	3.68E-02	5.42E-03	-1.30E+08	1.93E+08	3.74E+06
0.68	2.52E-04	68	1.26E-08	1.05E+12	0.00E+00	3.74E-02	5.50E-03	-1.32E+08	1.95E+08	3.80E+06
0.69	2.52E-04	69	1.26E-08	1.06E+12	0.00E+00	3.79E-02	5.58E-03	-1.34E+08	1.98E+08	3.85E+06
0.7	2.56E-04	70	1.28E-08	1.08E+12	0.00E+00	3.85E-02	5.66E-03	-1.36E+08	2.01E+08	3.91E+06
0.71	2.60E-04	71	1.30E-08	1.09E+12	0.00E+00	3.90E-02	5.74E-03	-1.38E+08	2.04E+08	3.97E+06
0.72	2.67E-04	72	1.33E-08	1.11E+12	0.00E+00	3.96E-02	5.82E-03	-1.40E+08	2.07E+08	4.02E+06
0.73	2.70E-04	73	1.35E-08	1.13E+12	0.00E+00	4.01E-02	5.90E-03	-1.42E+08	2.10E+08	4.08E+06
0.74	2.73E-04	74	1.37E-08	1.14E+12	0.00E+00	4.07E-02	5.99E-03	-1.43E+08	2.13E+08	4.13E+06
0.75	2.79E-04	75	1.40E-08	1.16E+12	0.00E+00	4.12E-02	6.07E-03	-1.45E+08	2.16E+08	4.19E+06
0.76	2.88E-04	76	1.44E-08	1.18E+12	0.00E+00	4.18E-02	6.15E-03	-1.47E+08	2.18E+08	4.24E+06
0.77	2.96E-04	77	1.48E-08	1.19E+12	0.00E+00	4.23E-02	6.23E-03	-1.49E+08	2.21E+08	4.30E+06
0.78	3.01E-04	78	1.51E-08	1.21E+12	0.00E+00	4.29E-02	6.31E-03	-1.51E+08	2.24E+08	4.36E+06
0.79	3.09E-04	79	1.55E-08	1.22E+12	0.00E+00	4.34E-02	6.39E-03	-1.53E+08	2.27E+08	4.41E+06
0.8	3.20E-04	80	1.60E-08	1.24E+12	0.00E+00	4.40E-02	6.47E-03	-1.55E+08	2.30E+08	4.47E+06
0.81	3.28E-04	81	1.64E-08	1.25E+12	0.00E+00	4.45E-02	6.55E-03	-1.57E+08	2.33E+08	4.52E+06
0.82	3.37E-04	82	1.68E-08	1.27E+12	0.00E+00	4.51E-02	6.63E-03	-1.59E+08	2.36E+08	4.58E+06
0.83	3.49E-04	83	1.74E-08	1.31E+12	0.00E+00	4.56E-02	6.71E-03	-1.61E+08	2.39E+08	4.64E+06
0.84	3.60E-04	84	1.80E-08	1.33E+12	0.00E+00	4.62E-02	6.79E-03	-1.63E+08	2.41E+08	4.69E+06
0.85	3.72E-04	85	1.86E-08	1.34E+12	0.00E+00	4.67E-02	6.88E-03	-1.65E+08	2.44E+08	4.75E+06
0.86	3.84E-04	86	1.92E-08	1.36E+12	0.00E+00	4.73E-02	6.96E-03	-1.67E+08	2.47E+08	4.80E+06
0.87	3.99E-04	87	2.00E-08	1.37E+12	0.00E+00	4.78E-02	7.04E-03	-1.69E+08	2.50E+08	4.86E+06
0.88	4.15E-04	88	2.08E-08	1.39E+12	0.00E+00	4.84E-02	7.12E-03	-1.71E+08	2.53E+08	4.91E+06
0.89	4.82E-04	89	2.41E-08	1.41E+12	0.00E+00	4.89E-02	7.20E-03	-1.73E+08	2.56E+08	4.97E+06

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Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.9	5.40E-04	90	2.70E-08	1.42E+12	0.00E+00	4.95E-02	7.28E-03	-1.74E+08	2.59E+08	5.03E+06
0.91	5.97E-04	91	2.99E-08	1.38E+12	0.00E+00	5.00E-02	7.36E-03	-1.76E+08	2.62E+08	5.08E+06
0.92	6.55E-04	92	3.27E-08	1.34E+12	0.00E+00	5.06E-02	7.44E-03	-1.78E+08	2.64E+08	5.14E+06
0.93	7.12E-04	93	3.56E-08	1.32E+12	0.00E+00	5.11E-02	7.52E-03	-1.80E+08	2.67E+08	5.19E+06
0.94	7.70E-04	94	3.85E-08	1.30E+12	0.00E+00	5.17E-02	7.60E-03	-1.82E+08	2.70E+08	5.25E+06
0.95	8.27E-04	95	4.14E-08	1.28E+12	0.00E+00	5.22E-02	7.68E-03	-1.84E+08	2.73E+08	5.31E+06
0.96	8.85E-04	96	4.42E-08	1.26E+12	0.00E+00	5.28E-02	7.76E-03	-1.86E+08	2.76E+08	5.36E+06
0.97	9.42E-04	97	4.71E-08	1.24E+12	0.00E+00	5.33E-02	7.85E-03	-1.88E+08	2.79E+08	5.42E+06
0.98	1.00E-03	98	5.00E-08	1.22E+12	0.00E+00	5.39E-02	7.93E-03	-1.90E+08	2.82E+08	5.47E+06
0.99	1.04E-03	99	5.18E-08	1.20E+12	0.00E+00	5.44E-02	8.01E-03	-1.92E+08	2.84E+08	5.53E+06
1	1.06E-03	100	5.29E-08	1.18E+12	0.00E+00	5.50E-02	8.09E-03	-1.94E+08	2.87E+08	5.58E+06



Lampiran 2. Tabel Data Double-Hull Tanker T3 Kondisi Sagging

T3 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0	0.00E+00	0	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.1	-1.20E-05	1	-6.00E-10	-5.89E+10	0	5.20E-04	7.65E-05	-2.72E+06	1.83E+06	-5.28E+04
0.2	-1.60E-05	2	-8.00E-10	-6.86E+10	0	1.04E-03	1.53E-04	-5.43E+06	3.67E+06	-1.06E+05
0.3	-1.60E-05	3	-8.00E-10	-7.82E+10	0	1.56E-03	2.29E-04	-8.15E+06	5.50E+06	-1.58E+05
0.4	-2.00E-05	4	-1.00E-09	-8.79E+10	0	2.08E-03	3.06E-04	-1.09E+07	7.33E+06	-2.11E+05
0.5	-2.00E-05	5	-1.00E-09	-9.76E+10	0	2.60E-03	3.82E-04	-1.36E+07	9.16E+06	-2.64E+05
0.6	-2.40E-05	6	-1.20E-09	-1.07E+11	0	3.12E-03	4.59E-04	-1.63E+07	1.10E+07	-3.17E+05
0.7	-2.40E-05	7	-1.20E-09	-1.17E+11	0	3.64E-03	5.35E-04	-1.90E+07	1.28E+07	-3.70E+05
0.8	-2.80E-05	8	-1.40E-09	-1.27E+11	0	4.16E-03	6.12E-04	-2.17E+07	1.47E+07	-4.22E+05
0.9	-3.20E-05	9	-1.60E-09	-1.36E+11	0	4.68E-03	6.88E-04	-2.45E+07	1.65E+07	-4.75E+05
0.1	-3.20E-05	10	-1.60E-09	-1.46E+11	0	5.20E-03	7.65E-04	-2.72E+07	1.83E+07	-5.28E+05
0.11	-3.60E-05	11	-1.80E-09	-1.56E+11	0	5.72E-03	8.41E-04	-2.99E+07	2.02E+07	-5.81E+05
0.12	-3.60E-05	12	-1.80E-09	-1.65E+11	0	6.24E-03	9.18E-04	-3.26E+07	2.20E+07	-6.34E+05
0.13	-4.00E-05	13	-2.00E-09	-1.75E+11	0	6.76E-03	9.94E-04	-3.53E+07	2.38E+07	-6.86E+05
0.14	-4.00E-05	14	-2.00E-09	-1.85E+11	0	7.28E-03	1.07E-03	-3.80E+07	2.57E+07	-7.39E+05
0.15	-4.40E-05	15	-2.20E-09	-1.94E+11	0	7.80E-03	1.15E-03	-4.08E+07	2.75E+07	-7.92E+05
0.16	-4.80E-05	16	-2.40E-09	-2.04E+11	0	8.31E-03	1.22E-03	-4.35E+07	2.93E+07	-8.45E+05
0.17	-4.80E-05	17	-2.40E-09	-2.14E+11	0	8.83E-03	1.30E-03	-4.62E+07	3.12E+07	-8.98E+05
0.18	-5.20E-05	18	-2.60E-09	-2.23E+11	0	9.35E-03	1.38E-03	-4.89E+07	3.30E+07	-9.50E+05
0.19	-5.20E-05	19	-2.60E-09	-2.33E+11	0	9.87E-03	1.45E-03	-5.16E+07	3.48E+07	-1.00E+06
0.2	-5.60E-05	20	-2.80E-09	-2.43E+11	0	1.04E-02	1.53E-03	-5.43E+07	3.67E+07	-1.06E+06

T3 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.21	-6.00E-05	21	-3.00E-09	-2.52E+11	0	1.09E-02	1.61E-03	-5.71E+07	3.85E+07	-1.11E+06
0.22	-6.00E-05	22	-3.00E-09	-2.62E+11	0	1.14E-02	1.68E-03	-5.98E+07	4.03E+07	-1.16E+06
0.23	-6.40E-05	23	-3.20E-09	-2.72E+11	0	1.20E-02	1.76E-03	-6.25E+07	4.22E+07	-1.21E+06
0.24	-6.40E-05	24	-3.20E-09	-2.81E+11	0	1.25E-02	1.84E-03	-6.52E+07	4.40E+07	-1.27E+06
0.25	-6.80E-05	25	-3.40E-09	-2.91E+11	0	1.30E-02	1.91E-03	-6.79E+07	4.58E+07	-1.32E+06
0.26	-6.80E-05	26	-3.40E-09	-3.01E+11	0	1.35E-02	1.99E-03	-7.06E+07	4.77E+07	-1.37E+06
0.27	-7.20E-05	27	-3.60E-09	-3.10E+11	0	1.40E-02	2.06E-03	-7.34E+07	4.95E+07	-1.43E+06
0.28	-7.60E-05	28	-3.80E-09	-3.20E+11	0	1.46E-02	2.14E-03	-7.61E+07	5.13E+07	-1.48E+06
0.29	-7.60E-05	29	-3.80E-09	-3.30E+11	0	1.51E-02	2.22E-03	-7.88E+07	5.32E+07	-1.53E+06
0.3	-8.00E-05	30	-4.00E-09	-3.39E+11	0	1.56E-02	2.29E-03	-8.15E+07	5.50E+07	-1.58E+06
0.31	-8.00E-05	31	-4.00E-09	-3.49E+11	0	1.61E-02	2.37E-03	-8.42E+07	5.68E+07	-1.64E+06
0.32	-8.40E-05	32	-4.20E-09	-3.59E+11	0	1.66E-02	2.45E-03	-8.69E+07	5.87E+07	-1.69E+06
0.33	-8.40E-05	33	-4.20E-09	-3.69E+11	0	1.71E-02	2.52E-03	-8.97E+07	6.05E+07	-1.74E+06
0.34	-8.80E-05	34	-4.40E-09	-3.78E+11	0	1.77E-02	2.60E-03	-9.24E+07	6.23E+07	-1.80E+06
0.35	-9.20E-05	35	-4.60E-09	-3.88E+11	0	1.82E-02	2.68E-03	-9.51E+07	6.42E+07	-1.85E+06
0.36	-9.20E-05	36	-4.60E-09	-3.98E+11	0	1.87E-02	2.75E-03	-9.78E+07	6.60E+07	-1.90E+06
0.37	-9.60E-05	37	-4.80E-09	-4.07E+11	0	1.92E-02	2.83E-03	-1.01E+08	6.78E+07	-1.95E+06
0.38	-9.60E-05	38	-4.80E-09	-4.17E+11	0	1.97E-02	2.91E-03	-1.03E+08	6.97E+07	-2.01E+06
0.39	-1.00E-04	39	-5.00E-09	-4.27E+11	0	2.03E-02	2.98E-03	-1.06E+08	7.15E+07	-2.06E+06
0.4	-1.00E-04	40	-5.00E-09	-4.36E+11	0	2.08E-02	3.06E-03	-1.09E+08	7.33E+07	-2.11E+06
0.41	-1.04E-04	41	-5.20E-09	-4.46E+11	0	2.13E-02	3.14E-03	-1.11E+08	7.51E+07	-2.17E+06
0.42	-1.08E-04	42	-5.40E-09	-4.56E+11	0	2.18E-02	3.21E-03	-1.14E+08	7.70E+07	-2.22E+06
0.43	-1.08E-04	43	-5.40E-09	-4.65E+11	0	2.23E-02	3.29E-03	-1.17E+08	7.88E+07	-2.27E+06

T3 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.44	-1.12E-04	44	-5.60E-09	-4.75E+11	0	2.29E-02	3.36E-03	-1.20E+08	8.06E+07	-2.32E+06
0.45	-1.12E-04	45	-5.60E-09	-4.85E+11	0	2.34E-02	3.44E-03	-1.22E+08	8.25E+07	-2.38E+06
0.46	-1.16E-04	46	-5.80E-09	-4.94E+11	0	2.39E-02	3.52E-03	-1.25E+08	8.43E+07	-2.43E+06
0.47	-1.20E-04	47	-6.00E-09	-5.04E+11	0	2.44E-02	3.59E-03	-1.28E+08	8.61E+07	-2.48E+06
0.48	-1.20E-04	48	-6.00E-09	-5.14E+11	0	2.49E-02	3.67E-03	-1.30E+08	8.80E+07	-2.53E+06
0.49	-1.24E-04	49	-6.20E-09	-5.23E+11	0	2.55E-02	3.75E-03	-1.33E+08	8.98E+07	-2.59E+06
0.5	-1.24E-04	50	-6.20E-09	-5.33E+11	0	2.60E-02	3.82E-03	-1.36E+08	9.16E+07	-2.64E+06
0.51	-1.28E-04	51	-6.40E-09	-5.43E+11	0	2.65E-02	3.90E-03	-1.39E+08	9.35E+07	-2.69E+06
0.52	-1.28E-04	52	-6.40E-09	-5.52E+11	0	2.70E-02	3.98E-03	-1.41E+08	9.53E+07	-2.75E+06
0.53	-1.32E-04	53	-6.60E-09	-5.62E+11	0	2.75E-02	4.05E-03	-1.44E+08	9.71E+07	-2.80E+06
0.54	-1.36E-04	54	-6.80E-09	-5.72E+11	0	2.81E-02	4.13E-03	-1.47E+08	9.90E+07	-2.85E+06
0.55	-1.36E-04	55	-6.80E-09	-5.81E+11	0	2.86E-02	4.21E-03	-1.49E+08	1.01E+08	-2.90E+06
0.56	-1.40E-04	56	-7.00E-09	-5.91E+11	0	2.91E-02	4.28E-03	-1.52E+08	1.03E+08	-2.96E+06
0.57	-1.40E-04	57	-7.00E-09	-6.01E+11	0	2.96E-02	4.36E-03	-1.55E+08	1.04E+08	-3.01E+06
0.58	-1.44E-04	58	-7.20E-09	-6.10E+11	0	3.01E-02	4.44E-03	-1.58E+08	1.06E+08	-3.06E+06
0.59	-1.44E-04	59	-7.20E-09	-6.20E+11	0	3.07E-02	4.51E-03	-1.60E+08	1.08E+08	-3.12E+06
0.6	-1.48E-04	60	-7.40E-09	-6.30E+11	0	3.12E-02	4.59E-03	-1.63E+08	1.10E+08	-3.17E+06
0.61	-1.52E-04	61	-7.60E-09	-6.39E+11	0	3.17E-02	4.66E-03	-1.66E+08	1.12E+08	-3.22E+06
0.62	-1.52E-04	62	-7.60E-09	-6.49E+11	0	3.22E-02	4.74E-03	-1.68E+08	1.14E+08	-3.27E+06
0.63	-1.56E-04	63	-7.80E-09	-6.59E+11	0	3.27E-02	4.82E-03	-1.71E+08	1.15E+08	-3.33E+06
0.64	-1.56E-04	64	-7.80E-09	-6.68E+11	0	3.33E-02	4.89E-03	-1.74E+08	1.17E+08	-3.38E+06
0.65	-1.60E-04	65	-8.00E-09	-6.78E+11	0	3.38E-02	4.97E-03	-1.77E+08	1.19E+08	-3.43E+06
0.66	-1.60E-04	66	-8.00E-09	-6.88E+11	0	3.43E-02	5.05E-03	-1.79E+08	1.21E+08	-3.49E+06

T3 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.67	-1.64E-04	67	-8.20E-09	-6.97E+11	0	3.48E-02	5.12E-03	-1.82E+08	1.23E+08	-3.54E+06
0.68	-1.68E-04	68	-8.40E-09	-7.07E+11	0	3.53E-02	5.20E-03	-1.85E+08	1.25E+08	-3.59E+06
0.69	-1.68E-04	69	-8.40E-09	-7.17E+11	0	3.59E-02	5.28E-03	-1.87E+08	1.26E+08	-3.64E+06
0.7	-1.72E-04	70	-8.60E-09	-7.27E+11	0	3.64E-02	5.35E-03	-1.90E+08	1.28E+08	-3.70E+06
0.71	-1.72E-04	71	-8.60E-09	-7.36E+11	0	3.69E-02	5.43E-03	-1.93E+08	1.30E+08	-3.75E+06
0.72	-1.76E-04	72	-8.80E-09	-7.46E+11	0	3.74E-02	5.51E-03	-1.96E+08	1.32E+08	-3.80E+06
0.73	-1.80E-04	73	-9.00E-09	-7.56E+11	0	3.79E-02	5.58E-03	-1.98E+08	1.34E+08	-3.85E+06
0.74	-1.80E-04	74	-9.00E-09	-7.65E+11	0	3.85E-02	5.66E-03	-2.01E+08	1.36E+08	-3.91E+06
0.75	-1.84E-04	75	-9.20E-09	-7.75E+11	0	3.90E-02	5.74E-03	-2.04E+08	1.37E+08	-3.96E+06
0.76	-1.84E-04	76	-9.20E-09	-7.85E+11	0	3.95E-02	5.81E-03	-2.06E+08	1.39E+08	-4.01E+06
0.77	-1.88E-04	77	-9.40E-09	-7.94E+11	0	4.00E-02	5.89E-03	-2.09E+08	1.41E+08	-4.07E+06
0.78	-1.88E-04	78	-9.40E-09	-8.04E+11	0	4.05E-02	5.97E-03	-2.12E+08	1.43E+08	-4.12E+06
0.79	-1.92E-04	79	-9.60E-09	-8.14E+11	0	4.11E-02	6.04E-03	-2.15E+08	1.45E+08	-4.17E+06
0.8	-1.96E-04	80	-9.80E-09	-8.23E+11	0	4.16E-02	6.12E-03	-2.17E+08	1.47E+08	-4.22E+06
0.81	-1.96E-04	81	-9.80E-09	-8.33E+11	0	4.21E-02	6.19E-03	-2.20E+08	1.48E+08	-4.28E+06
0.82	-2.00E-04	82	-1.00E-08	-8.43E+11	0	4.26E-02	6.27E-03	-2.23E+08	1.50E+08	-4.33E+06
0.83	-2.04E-04	83	-1.02E-08	-8.52E+11	0	4.31E-02	6.35E-03	-2.26E+08	1.52E+08	-4.38E+06
0.84	-2.04E-04	84	-1.02E-08	-8.62E+11	0	4.37E-02	6.42E-03	-2.28E+08	1.54E+08	-4.44E+06
0.85	-2.08E-04	85	-1.04E-08	-8.72E+11	0	4.42E-02	6.50E-03	-2.31E+08	1.56E+08	-4.49E+06
0.86	-2.08E-04	86	-1.04E-08	-8.81E+11	0	4.47E-02	6.58E-03	-2.34E+08	1.58E+08	-4.54E+06
0.87	-2.14E-04	87	-1.07E-08	-8.91E+11	0	4.52E-02	6.65E-03	-2.36E+08	1.59E+08	-4.59E+06
0.88	-2.16E-04	88	-1.08E-08	-8.97E+11	0	4.57E-02	6.73E-03	-2.39E+08	1.61E+08	-4.65E+06
0.89	-2.31E-04	89	-1.15E-08	-9.38E+11	0	4.63E-02	6.81E-03	-2.42E+08	1.63E+08	-4.70E+06

T3 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.9	-2.51E-04	90	-1.25E-08	-9.34E+11	0	4.68E-02	6.88E-03	-2.45E+08	1.65E+08	-4.75E+06
0.91	-2.98E-04	91	-1.49E-08	-9.19E+11	0	4.73E-02	6.96E-03	-2.47E+08	1.67E+08	-4.81E+06
0.92	-3.91E-04	92	-1.95E-08	-8.66E+11	0	4.78E-02	7.04E-03	-2.50E+08	1.69E+08	-4.86E+06
0.93	-4.83E-04	93	-2.42E-08	-8.24E+11	0	4.83E-02	7.11E-03	-2.53E+08	1.70E+08	-4.91E+06
0.94	-5.76E-04	94	-2.88E-08	-7.77E+11	0	4.88E-02	7.19E-03	-2.55E+08	1.72E+08	-4.96E+06
0.95	-6.69E-04	95	-3.34E-08	-7.20E+11	0	4.94E-02	7.27E-03	-2.58E+08	1.74E+08	-5.02E+06
0.96	-7.62E-04	96	-3.81E-08	-6.68E+11	0	4.99E-02	7.34E-03	-2.61E+08	1.76E+08	-5.07E+06
0.97	-8.54E-04	97	-4.27E-08	-6.33E+11	0	5.04E-02	7.42E-03	-2.64E+08	1.78E+08	-5.12E+06
0.98	-9.47E-04	98	-4.74E-08	-6.06E+11	0	5.09E-02	7.49E-03	-2.66E+08	1.80E+08	-5.17E+06
0.99	-1.04E-03	99	-5.20E-08	-5.84E+11	0	5.14E-02	7.57E-03	-2.69E+08	1.81E+08	-5.23E+06
1	-1.05E-03	100	-5.27E-08	-5.71E+11	0	5.20E-02	7.65E-03	-2.72E+08	1.83E+08	-5.28E+06

Lampiran 3. Tabel Data Double-Hull Tanker T4 Kondisi Hogging

T4 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0	0.00E+00	0	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.00E-02	1.20E-05	1	6.00E-10	6.23E+10	0.00E+00	4.76E-04	7.43E-05	-1.81E+06	2.66E+06	2.95E+04
2.00E-02	1.60E-05	2	8.00E-10	7.87E+10	0.00E+00	9.51E-04	1.49E-04	-3.62E+06	5.32E+06	5.90E+04
3.00E-02	2.00E-05	3	1.00E-09	9.50E+10	0.00E+00	1.43E-03	2.23E-04	-5.44E+06	7.98E+06	8.84E+04
4.00E-02	2.40E-05	4	1.20E-09	1.11E+11	0.00E+00	1.90E-03	2.97E-04	-7.25E+06	1.06E+07	1.18E+05
5.00E-02	2.40E-05	5	1.20E-09	1.28E+11	0.00E+00	2.38E-03	3.72E-04	-9.06E+06	1.33E+07	1.47E+05
6.00E-02	2.80E-05	6	1.40E-09	1.44E+11	0.00E+00	2.85E-03	4.46E-04	-1.09E+07	1.60E+07	1.77E+05
7.00E-02	3.20E-05	7	1.60E-09	1.61E+11	0.00E+00	3.33E-03	5.20E-04	-1.27E+07	1.86E+07	2.06E+05
8.00E-02	3.60E-05	8	1.80E-09	1.77E+11	0.00E+00	3.80E-03	5.95E-04	-1.45E+07	2.13E+07	2.36E+05
9.00E-02	4.00E-05	9	2.00E-09	1.93E+11	0.00E+00	4.28E-03	6.69E-04	-1.63E+07	2.39E+07	2.65E+05
0.1	4.40E-05	10	2.20E-09	2.10E+11	0.00E+00	4.76E-03	7.43E-04	-1.81E+07	2.66E+07	2.95E+05
0.11	4.80E-05	11	2.40E-09	2.26E+11	0.00E+00	5.23E-03	8.17E-04	-1.99E+07	2.93E+07	3.24E+05
0.12	5.20E-05	12	2.60E-09	2.43E+11	0.00E+00	5.71E-03	8.92E-04	-2.17E+07	3.19E+07	3.54E+05
0.13	5.60E-05	13	2.80E-09	2.59E+11	0.00E+00	6.18E-03	9.66E-04	-2.36E+07	3.46E+07	3.83E+05
0.14	5.60E-05	14	2.80E-09	2.75E+11	0.00E+00	6.66E-03	1.04E-03	-2.54E+07	3.72E+07	4.13E+05
0.15	6.00E-05	15	3.00E-09	2.92E+11	0.00E+00	7.13E-03	1.11E-03	-2.72E+07	3.99E+07	4.42E+05
0.16	6.40E-05	16	3.20E-09	3.08E+11	0.00E+00	7.61E-03	1.19E-03	-2.90E+07	4.26E+07	4.72E+05
0.17	6.80E-05	17	3.40E-09	3.24E+11	0.00E+00	8.08E-03	1.26E-03	-3.08E+07	4.52E+07	5.01E+05
0.18	7.20E-05	18	3.60E-09	3.41E+11	0.00E+00	8.56E-03	1.34E-03	-3.26E+07	4.79E+07	5.31E+05
0.19	7.60E-05	19	3.80E-09	3.57E+11	0.00E+00	9.04E-03	1.41E-03	-3.44E+07	5.05E+07	5.60E+05
0.2	8.00E-05	20	4.00E-09	3.74E+11	0.00E+00	9.51E-03	1.49E-03	-3.62E+07	5.32E+07	5.90E+05

T4 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.21	8.40E-05	21	4.20E-09	3.90E+11	0.00E+00	9.99E-03	1.56E-03	-3.80E+07	5.59E+07	6.19E+05
0.22	8.40E-05	22	4.20E-09	4.06E+11	0.00E+00	1.05E-02	1.63E-03	-3.99E+07	5.85E+07	6.48E+05
0.23	8.80E-05	23	4.40E-09	4.23E+11	0.00E+00	1.09E-02	1.71E-03	-4.17E+07	6.12E+07	6.78E+05
0.24	9.20E-05	24	4.60E-09	4.39E+11	0.00E+00	1.14E-02	1.78E-03	-4.35E+07	6.38E+07	7.07E+05
0.25	9.60E-05	25	4.80E-09	4.56E+11	0.00E+00	1.19E-02	1.86E-03	-4.53E+07	6.65E+07	7.37E+05
0.26	1.00E-04	26	5.00E-09	4.72E+11	0.00E+00	1.24E-02	1.93E-03	-4.71E+07	6.92E+07	7.66E+05
0.27	1.04E-04	27	5.20E-09	4.88E+11	0.00E+00	1.28E-02	2.01E-03	-4.89E+07	7.18E+07	7.96E+05
0.28	1.08E-04	28	5.40E-09	5.05E+11	0.00E+00	1.33E-02	2.08E-03	-5.07E+07	7.45E+07	8.25E+05
0.29	1.12E-04	29	5.60E-09	5.21E+11	0.00E+00	1.38E-02	2.16E-03	-5.25E+07	7.71E+07	8.55E+05
0.3	1.16E-04	30	5.80E-09	5.37E+11	0.00E+00	1.43E-02	2.23E-03	-5.44E+07	7.98E+07	8.84E+05
0.31	1.16E-04	31	5.80E-09	5.54E+11	0.00E+00	1.47E-02	2.30E-03	-5.62E+07	8.25E+07	9.14E+05
0.32	1.20E-04	32	6.00E-09	5.70E+11	0.00E+00	1.52E-02	2.38E-03	-5.80E+07	8.51E+07	9.43E+05
0.33	1.24E-04	33	6.20E-09	5.87E+11	0.00E+00	1.57E-02	2.45E-03	-5.98E+07	8.78E+07	9.73E+05
0.34	1.28E-04	34	6.40E-09	6.03E+11	0.00E+00	1.62E-02	2.53E-03	-6.16E+07	9.04E+07	1.00E+06
0.35	1.32E-04	35	6.60E-09	6.19E+11	0.00E+00	1.66E-02	2.60E-03	-6.34E+07	9.31E+07	1.03E+06
0.36	1.36E-04	36	6.80E-09	6.36E+11	0.00E+00	1.71E-02	2.68E-03	-6.52E+07	9.58E+07	1.06E+06
0.37	1.40E-04	37	7.00E-09	6.52E+11	0.00E+00	1.76E-02	2.75E-03	-6.70E+07	9.84E+07	1.09E+06
0.38	1.44E-04	38	7.20E-09	6.69E+11	0.00E+00	1.81E-02	2.82E-03	-6.88E+07	1.01E+08	1.12E+06
0.39	1.48E-04	39	7.40E-09	6.85E+11	0.00E+00	1.85E-02	2.90E-03	-7.07E+07	1.04E+08	1.15E+06
0.4	1.48E-04	40	7.40E-09	7.01E+11	0.00E+00	1.90E-02	2.97E-03	-7.25E+07	1.06E+08	1.18E+06
0.41	1.52E-04	41	7.60E-09	7.18E+11	0.00E+00	1.95E-02	3.05E-03	-7.43E+07	1.09E+08	1.21E+06
0.42	1.56E-04	42	7.80E-09	7.34E+11	0.00E+00	2.00E-02	3.12E-03	-7.61E+07	1.12E+08	1.24E+06
0.43	1.60E-04	43	8.00E-09	7.50E+11	0.00E+00	2.04E-02	3.20E-03	-7.79E+07	1.14E+08	1.27E+06

T4 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.44	1.64E-04	44	8.20E-09	7.67E+11	0.00E+00	2.09E-02	3.27E-03	-7.97E+07	1.17E+08	1.30E+06
0.45	1.68E-04	45	8.40E-09	7.83E+11	0.00E+00	2.14E-02	3.34E-03	-8.15E+07	1.20E+08	1.33E+06
0.46	1.72E-04	46	8.60E-09	8.00E+11	0.00E+00	2.19E-02	3.42E-03	-8.33E+07	1.22E+08	1.36E+06
0.47	1.76E-04	47	8.80E-09	8.16E+11	0.00E+00	2.24E-02	3.49E-03	-8.52E+07	1.25E+08	1.39E+06
0.48	1.80E-04	48	9.00E-09	8.32E+11	0.00E+00	2.28E-02	3.57E-03	-8.70E+07	1.28E+08	1.41E+06
0.49	1.80E-04	49	9.00E-09	8.49E+11	0.00E+00	2.33E-02	3.64E-03	-8.88E+07	1.30E+08	1.44E+06
0.5	1.84E-04	50	9.20E-09	8.65E+11	0.00E+00	2.38E-02	3.72E-03	-9.06E+07	1.33E+08	1.47E+06
0.51	1.88E-04	51	9.40E-09	8.82E+11	0.00E+00	2.43E-02	3.79E-03	-9.24E+07	1.36E+08	1.50E+06
0.52	1.92E-04	52	9.60E-09	8.98E+11	0.00E+00	2.47E-02	3.86E-03	-9.42E+07	1.38E+08	1.53E+06
0.53	1.96E-04	53	9.80E-09	9.14E+11	0.00E+00	2.52E-02	3.94E-03	-9.60E+07	1.41E+08	1.56E+06
0.54	2.00E-04	54	1.00E-08	9.31E+11	0.00E+00	2.57E-02	4.01E-03	-9.78E+07	1.44E+08	1.59E+06
0.55	2.04E-04	55	1.02E-08	9.47E+11	0.00E+00	2.62E-02	4.09E-03	-9.96E+07	1.46E+08	1.62E+06
0.56	2.08E-04	56	1.04E-08	9.63E+11	0.00E+00	2.66E-02	4.16E-03	-1.01E+08	1.49E+08	1.65E+06
0.57	2.12E-04	57	1.06E-08	9.80E+11	0.00E+00	2.71E-02	4.24E-03	-1.03E+08	1.52E+08	1.68E+06
0.58	2.12E-04	58	1.06E-08	9.96E+11	0.00E+00	2.76E-02	4.31E-03	-1.05E+08	1.54E+08	1.71E+06
0.59	2.16E-04	59	1.08E-08	1.01E+12	0.00E+00	2.81E-02	4.38E-03	-1.07E+08	1.57E+08	1.74E+06
0.6	2.20E-04	60	1.10E-08	1.03E+12	0.00E+00	2.85E-02	4.46E-03	-1.09E+08	1.60E+08	1.77E+06
0.61	2.24E-04	61	1.12E-08	1.05E+12	0.00E+00	2.90E-02	4.53E-03	-1.11E+08	1.62E+08	1.80E+06
0.62	2.28E-04	62	1.14E-08	1.06E+12	0.00E+00	2.95E-02	4.61E-03	-1.12E+08	1.65E+08	1.83E+06
0.63	2.32E-04	63	1.16E-08	1.08E+12	0.00E+00	3.00E-02	4.68E-03	-1.14E+08	1.68E+08	1.86E+06
0.64	2.36E-04	64	1.18E-08	1.09E+12	0.00E+00	3.04E-02	4.76E-03	-1.16E+08	1.70E+08	1.89E+06
0.65	2.40E-04	65	1.20E-08	1.11E+12	0.00E+00	3.09E-02	4.83E-03	-1.18E+08	1.73E+08	1.92E+06
0.66	2.44E-04	66	1.22E-08	1.13E+12	0.00E+00	3.14E-02	4.90E-03	-1.20E+08	1.76E+08	1.95E+06



T4 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.67	2.44E-04	67	1.22E-08	1.14E+12	0.00E+00	3.19E-02	4.98E-03	-1.21E+08	1.78E+08	1.97E+06
0.68	2.48E-04	68	1.24E-08	1.16E+12	0.00E+00	3.23E-02	5.05E-03	-1.23E+08	1.81E+08	2.00E+06
0.69	2.52E-04	69	1.26E-08	1.18E+12	0.00E+00	3.28E-02	5.13E-03	-1.25E+08	1.84E+08	2.03E+06
0.7	2.56E-04	70	1.28E-08	1.19E+12	0.00E+00	3.33E-02	5.20E-03	-1.27E+08	1.86E+08	2.06E+06
0.71	2.60E-04	71	1.30E-08	1.21E+12	0.00E+00	3.38E-02	5.28E-03	-1.29E+08	1.89E+08	2.09E+06
0.72	2.64E-04	72	1.32E-08	1.23E+12	0.00E+00	3.42E-02	5.35E-03	-1.30E+08	1.92E+08	2.12E+06
0.73	2.68E-04	73	1.34E-08	1.24E+12	0.00E+00	3.47E-02	5.42E-03	-1.32E+08	1.94E+08	2.15E+06
0.74	2.71E-04	74	1.35E-08	1.26E+12	0.00E+00	3.52E-02	5.50E-03	-1.34E+08	1.97E+08	2.18E+06
0.75	2.74E-04	75	1.37E-08	1.27E+12	0.00E+00	3.57E-02	5.57E-03	-1.36E+08	2.00E+08	2.21E+06
0.76	2.81E-04	76	1.40E-08	1.29E+12	0.00E+00	3.61E-02	5.65E-03	-1.38E+08	2.02E+08	2.24E+06
0.77	3.00E-04	77	1.50E-08	1.33E+12	0.00E+00	3.66E-02	5.72E-03	-1.40E+08	2.05E+08	2.27E+06
0.78	3.18E-04	78	1.59E-08	1.37E+12	0.00E+00	3.71E-02	5.80E-03	-1.41E+08	2.08E+08	2.30E+06
0.79	3.37E-04	79	1.69E-08	1.40E+12	0.00E+00	3.76E-02	5.87E-03	-1.43E+08	2.10E+08	2.33E+06
0.8	3.56E-04	80	1.78E-08	1.43E+12	0.00E+00	3.80E-02	5.95E-03	-1.45E+08	2.13E+08	2.36E+06
0.81	3.75E-04	81	1.88E-08	1.46E+12	0.00E+00	3.85E-02	6.02E-03	-1.47E+08	2.15E+08	2.39E+06
0.82	3.94E-04	82	1.97E-08	1.48E+12	0.00E+00	3.90E-02	6.09E-03	-1.49E+08	2.18E+08	2.42E+06
0.83	4.13E-04	83	2.07E-08	1.50E+12	0.00E+00	3.95E-02	6.17E-03	-1.50E+08	2.21E+08	2.45E+06
0.84	4.32E-04	84	2.16E-08	1.50E+12	0.00E+00	3.99E-02	6.24E-03	-1.52E+08	2.23E+08	2.48E+06
0.85	4.51E-04	85	2.25E-08	1.51E+12	0.00E+00	4.04E-02	6.32E-03	-1.54E+08	2.26E+08	2.51E+06
0.86	4.70E-04	86	2.35E-08	1.51E+12	0.00E+00	4.09E-02	6.39E-03	-1.56E+08	2.29E+08	2.53E+06
0.87	4.89E-04	87	2.44E-08	1.52E+12	0.00E+00	4.14E-02	6.47E-03	-1.58E+08	2.31E+08	2.56E+06
0.88	5.08E-04	88	2.54E-08	1.54E+12	0.00E+00	4.18E-02	6.54E-03	-1.59E+08	2.34E+08	2.59E+06
0.89	5.27E-04	89	2.63E-08	1.55E+12	0.00E+00	4.23E-02	6.61E-03	-1.61E+08	2.37E+08	2.62E+06

T4 Hogging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.9	5.46E-04	90	2.73E-08	1.57E+12	0.00E+00	4.28E-02	6.69E-03	-1.63E+08	2.39E+08	2.65E+06
0.91	5.46E-04	91	2.73E-08	1.57E+12	0.00E+00	4.33E-02	6.76E-03	-1.65E+08	2.42E+08	2.68E+06
0.92	5.71E-04	92	2.85E-08	1.58E+12	0.00E+00	4.37E-02	6.84E-03	-1.67E+08	2.45E+08	2.71E+06
0.93	5.89E-04	93	2.95E-08	1.56E+12	0.00E+00	4.42E-02	6.91E-03	-1.69E+08	2.47E+08	2.74E+06
0.94	6.49E-04	94	3.24E-08	1.48E+12	0.00E+00	4.47E-02	6.99E-03	-1.70E+08	2.50E+08	2.77E+06
0.95	7.25E-04	95	3.62E-08	1.42E+12	0.00E+00	4.52E-02	7.06E-03	-1.72E+08	2.53E+08	2.80E+06
0.96	8.01E-04	96	4.01E-08	1.38E+12	0.00E+00	4.57E-02	7.13E-03	-1.74E+08	2.55E+08	2.83E+06
0.97	8.78E-04	97	4.39E-08	1.35E+12	0.00E+00	4.61E-02	7.21E-03	-1.76E+08	2.58E+08	2.86E+06
0.98	9.54E-04	98	4.77E-08	1.31E+12	0.00E+00	4.66E-02	7.28E-03	-1.78E+08	2.61E+08	2.89E+06
0.99	1.03E-03	99	5.13E-08	1.25E+12	0.00E+00	4.71E-02	7.36E-03	-1.79E+08	2.63E+08	2.92E+06
1	1.05E-03	100	5.23E-08	1.24E+12	0.00E+00	4.76E-02	7.43E-03	-1.81E+08	2.66E+08	2.95E+06

Lampiran 4. Tabel Data Double-Hull Tanker T4 Kondisi Sagging

T4 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0	0.00E+000	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.01	-1.20E-05	1.00E+00	-6.00E-10	-5.89E+10	0	4.50E-04	7.03E-05	-2.52E+06	1.71E+06	-2.79E+04
0.02	-1.20E-05	2.00E+00	-6.00E-10	-7.10E+10	0	8.99E-04	1.41E-04	-5.03E+06	3.43E+06	-5.57E+04
0.03	-1.60E-05	3.00E+00	-8.00E-10	-8.30E+10	0	1.35E-03	2.11E-04	-7.55E+06	5.14E+06	-8.36E+04
0.04	-2.00E-05	4.00E+00	-1.00E-09	-9.51E+10	0	1.80E-03	2.81E-04	-1.01E+07	6.85E+06	-1.11E+05
0.05	-2.00E-05	5.00E+00	-1.00E-09	-1.07E+11	0	2.25E-03	3.51E-04	-1.26E+07	8.57E+06	-1.39E+05
0.06	-2.40E-05	6.00E+00	-1.20E-09	-1.19E+11	0	2.70E-03	4.22E-04	-1.51E+07	1.03E+07	-1.67E+05
0.07	-2.80E-05	7.00E+00	-1.40E-09	-1.31E+11	0	3.15E-03	4.92E-04	-1.76E+07	1.20E+07	-1.95E+05
0.08	-2.80E-05	8.00E+00	-1.40E-09	-1.43E+11	0	3.60E-03	5.62E-04	-2.01E+07	1.37E+07	-2.23E+05
0.09	-3.20E-05	9.00E+00	-1.60E-09	-1.55E+11	0	4.05E-03	6.32E-04	-2.26E+07	1.54E+07	-2.51E+05
0.1	-3.60E-05	1.00E+01	-1.80E-09	-1.67E+11	0	4.50E-03	7.03E-04	-2.52E+07	1.71E+07	-2.79E+05
0.11	-3.60E-05	1.10E+01	-1.80E-09	-1.80E+11	0	4.95E-03	7.73E-04	-2.77E+07	1.88E+07	-3.07E+05
0.12	-4.00E-05	1.20E+01	-2.00E-09	-1.92E+11	0	5.40E-03	8.43E-04	-3.02E+07	2.06E+07	-3.34E+05
0.13	-4.40E-05	1.30E+01	-2.20E-09	-2.04E+11	0	5.85E-03	9.13E-04	-3.27E+07	2.23E+07	-3.62E+05
0.14	-4.40E-05	1.40E+01	-2.20E-09	-2.16E+11	0	6.29E-03	9.84E-04	-3.52E+07	2.40E+07	-3.90E+05
0.15	-4.80E-05	1.50E+01	-2.40E-09	-2.28E+11	0	6.74E-03	1.05E-03	-3.77E+07	2.57E+07	-4.18E+05
0.16	-4.80E-05	1.60E+01	-2.40E-09	-2.40E+11	0	7.19E-03	1.12E-03	-4.02E+07	2.74E+07	-4.46E+05
0.17	-5.20E-05	1.70E+01	-2.60E-09	-2.52E+11	0	7.64E-03	1.19E-03	-4.28E+07	2.91E+07	-4.74E+05
0.18	-5.60E-05	1.80E+01	-2.80E-09	-2.64E+11	0	8.09E-03	1.26E-03	-4.53E+07	3.08E+07	-5.02E+05
0.19	-5.60E-05	1.90E+01	-2.80E-09	-2.76E+11	0	8.54E-03	1.34E-03	-4.78E+07	3.25E+07	-5.30E+05
0.2	-6.00E-05	2.00E+01	-3.00E-09	-2.88E+11	0	8.99E-03	1.41E-03	-5.03E+07	3.43E+07	-5.57E+05

T4 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.21	-6.40E-05	2.10E+01	-3.20E-09	-3.00E+11	0	9.44E-03	1.48E-03	-5.28E+07	3.60E+07	-5.85E+05
0.22	-6.40E-05	2.20E+01	-3.20E-09	-3.12E+11	0	9.89E-03	1.55E-03	-5.53E+07	3.77E+07	-6.13E+05
0.23	-6.80E-05	2.30E+01	-3.40E-09	-3.24E+11	0	1.03E-02	1.62E-03	-5.79E+07	3.94E+07	-6.41E+05
0.24	-7.20E-05	2.40E+01	-3.60E-09	-3.36E+11	0	1.08E-02	1.69E-03	-6.04E+07	4.11E+07	-6.69E+05
0.25	-7.20E-05	2.50E+01	-3.60E-09	-3.49E+11	0	1.12E-02	1.76E-03	-6.29E+07	4.28E+07	-6.97E+05
0.26	-7.60E-05	2.60E+01	-3.80E-09	-3.61E+11	0	1.17E-02	1.83E-03	-6.54E+07	4.45E+07	-7.25E+05
0.27	-8.00E-05	2.70E+01	-4.00E-09	-3.73E+11	0	1.21E-02	1.90E-03	-6.79E+07	4.63E+07	-7.52E+05
0.28	-8.00E-05	2.80E+01	-4.00E-09	-3.85E+11	0	1.26E-02	1.97E-03	-7.04E+07	4.80E+07	-7.80E+05
0.29	-8.40E-05	2.90E+01	-4.20E-09	-3.97E+11	0	1.30E-02	2.04E-03	-7.29E+07	4.97E+07	-8.08E+05
0.3	-8.80E-05	3.00E+01	-4.40E-09	-4.09E+11	0	1.35E-02	2.11E-03	-7.55E+07	5.14E+07	-8.36E+05
0.31	-8.80E-05	3.10E+01	-4.40E-09	-4.21E+11	0	1.39E-02	2.18E-03	-7.80E+07	5.31E+07	-8.64E+05
0.32	-9.20E-05	3.20E+01	-4.60E-09	-4.33E+11	0	1.44E-02	2.25E-03	-8.05E+07	5.48E+07	-8.92E+05
0.33	-9.60E-05	3.30E+01	-4.80E-09	-4.45E+11	0	1.48E-02	2.32E-03	-8.30E+07	5.65E+07	-9.20E+05
0.34	-9.60E-05	3.40E+01	-4.80E-09	-4.57E+11	0	1.53E-02	2.39E-03	-8.55E+07	5.82E+07	-9.48E+05
0.35	-1.00E-04	3.50E+01	-5.00E-09	-4.69E+11	0	1.57E-02	2.46E-03	-8.80E+07	6.00E+07	-9.75E+05
0.36	-1.04E-04	3.60E+01	-5.20E-09	-4.81E+11	0	1.62E-02	2.53E-03	-9.05E+07	6.17E+07	-1.00E+06
0.37	-1.04E-04	3.70E+01	-5.20E-09	-4.93E+11	0	1.66E-02	2.60E-03	-9.31E+07	6.34E+07	-1.03E+06
0.38	-1.08E-04	3.80E+01	-5.40E-09	-5.05E+11	0	1.71E-02	2.67E-03	-9.56E+07	6.51E+07	-1.06E+06
0.39	-1.12E-04	3.90E+01	-5.60E-09	-5.17E+11	0	1.75E-02	2.74E-03	-9.81E+07	6.68E+07	-1.09E+06
0.4	-1.12E-04	4.00E+01	-5.60E-09	-5.30E+11	0	1.80E-02	2.81E-03	-1.01E+08	6.85E+07	-1.11E+06
0.41	-1.16E-04	4.10E+01	-5.80E-09	-5.42E+11	0	1.84E-02	2.88E-03	-1.03E+08	7.02E+07	-1.14E+06
0.42	-1.16E-04	4.20E+01	-5.80E-09	-5.54E+11	0	1.89E-02	2.95E-03	-1.06E+08	7.19E+07	-1.17E+06
0.43	-1.20E-04	4.30E+01	-6.00E-09	-5.66E+11	0	1.93E-02	3.02E-03	-1.08E+08	7.37E+07	-1.20E+06

T4 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.44	-1.24E-04	4.40E+01	-6.20E-09	-5.78E+11	0	1.98E-02	3.09E-03	-1.11E+08	7.54E+07	-1.23E+06
0.45	-1.24E-04	4.50E+01	-6.20E-09	-5.90E+11	0	2.02E-02	3.16E-03	-1.13E+08	7.71E+07	-1.25E+06
0.46	-1.28E-04	4.60E+01	-6.40E-09	-6.02E+11	0	2.07E-02	3.23E-03	-1.16E+08	7.88E+07	-1.28E+06
0.47	-1.32E-04	4.70E+01	-6.60E-09	-6.14E+11	0	2.11E-02	3.30E-03	-1.18E+08	8.05E+07	-1.31E+06
0.48	-1.32E-04	4.80E+01	-6.60E-09	-6.26E+11	0	2.16E-02	3.37E-03	-1.21E+08	8.22E+07	-1.34E+06
0.49	-1.36E-04	4.90E+01	-6.80E-09	-6.38E+11	0	2.20E-02	3.44E-03	-1.23E+08	8.39E+07	-1.37E+06
0.5	-1.40E-04	5.00E+01	-7.00E-09	-6.50E+11	0	2.25E-02	3.51E-03	-1.26E+08	8.57E+07	-1.39E+06
0.51	-1.40E-04	5.10E+01	-7.00E-09	-6.62E+11	0	2.29E-02	3.58E-03	-1.28E+08	8.74E+07	-1.42E+06
0.52	-1.44E-04	5.20E+01	-7.20E-09	-6.74E+11	0	2.34E-02	3.65E-03	-1.31E+08	8.91E+07	-1.45E+06
0.53	-1.48E-04	5.30E+01	-7.40E-09	-6.86E+11	0	2.38E-02	3.72E-03	-1.33E+08	9.08E+07	-1.48E+06
0.54	-1.48E-04	5.40E+01	-7.40E-09	-6.98E+11	0	2.43E-02	3.79E-03	-1.36E+08	9.25E+07	-1.51E+06
0.55	-1.52E-04	5.50E+01	-7.60E-09	-7.11E+11	0	2.47E-02	3.86E-03	-1.38E+08	9.42E+07	-1.53E+06
0.56	-1.56E-04	5.60E+01	-7.80E-09	-7.23E+11	0	2.52E-02	3.93E-03	-1.41E+08	9.59E+07	-1.56E+06
0.57	-1.56E-04	5.70E+01	-7.80E-09	-7.35E+11	0	2.56E-02	4.01E-03	-1.43E+08	9.76E+07	-1.59E+06
0.58	-1.60E-04	5.80E+01	-8.00E-09	-7.47E+11	0	2.61E-02	4.08E-03	-1.46E+08	9.94E+07	-1.62E+06
0.59	-1.64E-04	5.90E+01	-8.20E-09	-7.59E+11	0	2.65E-02	4.15E-03	-1.48E+08	1.01E+08	-1.64E+06
0.6	-1.64E-04	6.00E+01	-8.20E-09	-7.71E+11	0	2.70E-02	4.22E-03	-1.51E+08	1.03E+08	-1.67E+06
0.61	-1.68E-04	6.10E+01	-8.40E-09	-7.83E+11	0	2.74E-02	4.29E-03	-1.53E+08	1.05E+08	-1.70E+06
0.62	-1.72E-04	6.20E+01	-8.60E-09	-7.95E+11	0	2.79E-02	4.36E-03	-1.56E+08	1.06E+08	-1.73E+06
0.63	-1.72E-04	6.30E+01	-8.60E-09	-8.07E+11	0	2.83E-02	4.43E-03	-1.58E+08	1.08E+08	-1.76E+06
0.64	-1.76E-04	6.40E+01	-8.80E-09	-8.19E+11	0	2.88E-02	4.50E-03	-1.61E+08	1.10E+08	-1.78E+06
0.65	-1.80E-04	6.50E+01	-9.00E-09	-8.31E+11	0	2.92E-02	4.57E-03	-1.63E+08	1.11E+08	-1.81E+06
0.66	-1.80E-04	6.60E+01	-9.00E-09	-8.43E+11	0	2.97E-02	4.64E-03	-1.66E+08	1.13E+08	-1.84E+06

T4 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.67	-1.84E-04	6.70E+01	-9.20E-09	-8.55E+11	0	3.01E-02	4.71E-03	-1.69E+08	1.15E+08	-1.87E+06
0.68	-1.88E-04	6.80E+01	-9.40E-09	-8.67E+11	0	3.06E-02	4.78E-03	-1.71E+08	1.16E+08	-1.90E+06
0.69	-1.88E-04	6.90E+01	-9.40E-09	-8.80E+11	0	3.10E-02	4.85E-03	-1.74E+08	1.18E+08	-1.92E+06
0.7	-1.92E-04	7.00E+01	-9.60E-09	-8.92E+11	0	3.15E-02	4.92E-03	-1.76E+08	1.20E+08	-1.95E+06
0.71	-1.92E-04	7.10E+01	-9.60E-09	-9.04E+11	0	3.19E-02	4.99E-03	-1.79E+08	1.22E+08	-1.98E+06
0.72	-1.96E-04	7.20E+01	-9.80E-09	-9.16E+11	0	3.24E-02	5.06E-03	-1.81E+08	1.23E+08	-2.01E+06
0.73	-2.00E-04	7.30E+01	-1.00E-08	-9.28E+11	0	3.28E-02	5.13E-03	-1.84E+08	1.25E+08	-2.03E+06
0.74	-2.00E-04	7.40E+01	-1.00E-08	-9.40E+11	0	3.33E-02	5.20E-03	-1.86E+08	1.27E+08	-2.06E+06
0.75	-2.04E-04	7.50E+01	-1.02E-08	-9.52E+11	0	3.37E-02	5.27E-03	-1.89E+08	1.28E+08	-2.09E+06
0.76	-2.08E-04	7.60E+01	-1.04E-08	-9.64E+11	0	3.42E-02	5.34E-03	-1.91E+08	1.30E+08	-2.12E+06
0.77	-2.08E-04	7.70E+01	-1.04E-08	-9.76E+11	0	3.46E-02	5.41E-03	-1.94E+08	1.32E+08	-2.15E+06
0.78	-2.12E-04	7.80E+01	-1.06E-08	-9.88E+11	0	3.51E-02	5.48E-03	-1.96E+08	1.34E+08	-2.17E+06
0.79	-2.16E-04	7.90E+01	-1.08E-08	-1.00E+12	0	3.55E-02	5.55E-03	-1.99E+08	1.35E+08	-2.20E+06
0.8	-2.16E-04	8.00E+01	-1.08E-08	-1.01E+12	0	3.60E-02	5.62E-03	-2.01E+08	1.37E+08	-2.23E+06
0.81	-2.20E-04	8.10E+01	-1.10E-08	-1.02E+12	0	3.64E-02	5.69E-03	-2.04E+08	1.39E+08	-2.26E+06
0.82	-2.24E-04	8.20E+01	-1.12E-08	-1.04E+12	0	3.69E-02	5.76E-03	-2.06E+08	1.40E+08	-2.29E+06
0.83	-2.24E-04	8.30E+01	-1.12E-08	-1.05E+12	0	3.73E-02	5.83E-03	-2.09E+08	1.42E+08	-2.31E+06
0.84	-2.28E-04	8.40E+01	-1.14E-08	-1.06E+12	0	3.78E-02	5.90E-03	-2.11E+08	1.44E+08	-2.34E+06
0.85	-2.32E-04	8.50E+01	-1.16E-08	-1.07E+12	0	3.82E-02	5.97E-03	-2.14E+08	1.46E+08	-2.37E+06
0.86	-2.32E-04	8.60E+01	-1.16E-08	-1.08E+12	0	3.87E-02	6.04E-03	-2.16E+08	1.47E+08	-2.40E+06
0.87	-2.36E-04	8.70E+01	-1.18E-08	-1.10E+12	0	3.91E-02	6.11E-03	-2.19E+08	1.49E+08	-2.42E+06
0.88	-2.40E-04	8.80E+01	-1.20E-08	-1.11E+12	0	3.96E-02	6.18E-03	-2.21E+08	1.51E+08	-2.45E+06
0.89	-2.46E-04	8.90E+01	-1.23E-08	-1.12E+12	0	4.00E-02	6.25E-03	-2.24E+08	1.52E+08	-2.48E+06

T4 Sagging					Deformasi			Tegangan		
Time	Rot X	Iteration	Curvature	MX	D <sub>min</sub> (m)	D <sub>maks</sub> (m)	D <sub>rata-rata</sub> (m)	S <sub>min</sub> (N.m <sup>2</sup> )	S <sub>maks</sub> (N.m <sup>2</sup> )	S <sub>rata-rata</sub> (N.m <sup>2</sup> )
0.9	-2.68E-04	9.00E+01	-1.34E-08	-1.19E+12	0	4.05E-02	6.32E-03	-2.26E+08	1.54E+08	-2.51E+06
0.91	-2.80E-04	9.10E+01	-1.40E-08	-1.19E+12	0	4.09E-02	6.39E-03	-2.29E+08	1.56E+08	-2.54E+06
0.92	-3.64E-04	9.20E+01	-1.82E-08	-1.13E+12	0	4.14E-02	6.46E-03	-2.31E+08	1.58E+08	-2.56E+06
0.93	-4.34E-04	9.30E+01	-2.17E-08	-1.08E+12	0	4.18E-02	6.53E-03	-2.34E+08	1.59E+08	-2.59E+06
0.94	-5.24E-04	9.40E+01	-2.62E-08	-1.04E+12	0	4.23E-02	6.60E-03	-2.36E+08	1.61E+08	-2.62E+06
0.95	-6.14E-04	9.50E+01	-3.07E-08	-9.69E+11	0	4.27E-02	6.68E-03	-2.39E+08	1.63E+08	-2.65E+06
0.96	-7.04E-04	9.60E+01	-3.52E-08	-9.09E+11	0	4.32E-02	6.75E-03	-2.41E+08	1.64E+08	-2.68E+06
0.97	-7.95E-04	9.70E+01	-3.97E-08	-8.60E+11	0	4.36E-02	6.82E-03	-2.44E+08	1.66E+08	-2.70E+06
0.98	-8.85E-04	9.80E+01	-4.42E-08	-7.99E+11	0	4.41E-02	6.89E-03	-2.46E+08	1.68E+08	-2.73E+06
0.99	-9.75E-04	9.90E+01	-4.87E-08	-7.49E+11	0	4.45E-02	6.96E-03	-2.49E+08	1.70E+08	-2.76E+06
1	-1.06E-03	1.00E+02	-5.32E-08	-6.84E+11	0	4.50E-02	7.03E-03	-2.52E+08	1.71E+08	-2.79E+06