

LAMPIRAN A
CONTOH PERHITUNGAN

Lampiran A. Contoh Perhitungan

A.1 Perhitungan % Kenaikan Hasil ARB

Rumus % kenaikan:

$$\% \text{ Kenaikan} = \frac{\text{Max Stress} - \text{UTS}}{\text{UTS}} \times 100\%$$

% Kenaikan pada hasil ARB dari aluminium tiga lapis:

$$\% \text{ Kenaikan} = \frac{225,55 - 80,497}{80,497} \times 100\%$$

$$\% \text{ Kenaikan} = 180\%$$

A.2 Perhitungan Rata-Rata % Kenaikan Hasil ARB

Rumus rata-rata %kenaikan:

$$\overline{\% \text{ Kenaikan}} = \frac{\text{Al 3 lapis} + \text{Cu 3 Lapis} + \text{Pb 3 lapis} + \text{Al 4 lapis} + \text{Cu 4 lapis} + \text{Pb 4 lapis}}{6}$$

$$\overline{\% \text{ Kenaikan}} = \frac{180\% + 328\% + 215\% + 291\% + 63\% + 27\%}{6}$$

$$\overline{\% \text{ Kenaikan}} = 184\%$$

A.3 Perhitungan Konversi dari V/m ke μT

Rumus konversi dari V/m (*E Field*) ke T (*H Field*):

$$H = \frac{E}{2,9851 \times 10^8}$$

Konversi dari V/m ke μT pada tembaga tiga lapis:

$$H = \frac{67.313,989}{2,9851 \times 10^8}$$

$$H = 0,0002255 \text{ T}$$

Apabila 1 T = 1.000.000 μT , maka 0,0002255 T = 225,5 μT

A.4 Perhitungan % Absorbansi Material Radiasi *Absorber*

Rumus % Absorbansi material radiasi *absorber*:

$$\% \text{ Absorbansi} = \left| \frac{\text{Pelat Material} - \text{Tanpa Pelat}}{\text{Tanpa Pelat}} \right| \times 100\%$$

% Absorbansi pada timbal tiga lapis:

$$\% \text{ Absorbansi} = \left| \frac{218,5 - 279,2}{279,2} \right| \times 100\%$$

$$\% \text{ Absorbansi} = 22\%$$

A.5 Perhitungan Rata-Rata % Absorbansi Material Radiasi *Absorber*

Rumus rata-rata % absorbansi material radiasi *absorber*:

$$\overline{\% \text{ Absorbansi}} = \frac{(\text{Al } 3\text{L} + \text{Cu } 3\text{L} + \text{Pb } 3\text{L} + \text{Al } 4\text{L} + \text{Cu } 4\text{L} + \text{Pb } 4\text{L})^*}{6}$$

$$\overline{\% \text{ Absorbansi}} = \frac{218,5 + 216,3 + 225,5 + 240,8 + 218,5 + 240,8}{6}$$

$$\overline{\% \text{ Absorbansi}} = 19\%$$

* Keterangan:

3L = Tiga Lapis

4L = Empat Lapis

LAMPIRAN B
DATA HASIL PENELITIAN

Lampiran B. Data Hasil Penelitian

B.1 Tabel Hasil Simulasi Pemanasan

Tabel B.1 Hasil Temperatur pada Simulasi Pemanasan Pelat Tiga Lapis

Al		Cu		Pb	
Waktu (detik)	Temperatur (°C)	Waktu (detik)	Temperatur (°C)	Waktu (detik)	Temperatur (°C)
1,2	52,216	1	55,734	3,3	39,439
2,4	76,701	2	83,298	4,4	44,07
6	134,09	5	147,33	5,5	48,577
12,557	203,72	10,243	221,88	8,8	61,169
19,126	250,19	15,495	271,63	18,7	92,287
25,693	281,16	20,746	304,78	41,799	140,32
32,26	301,79	25,997	326,88	64,207	171,24
38,827	315,54	31,248	341,6	86,08	191,36
45,395	324,7	36,499	351,41	107,95	204,63
51,962	330,81	41,75	357,94	129,83	213,37
58,529	334,88	47,001	362,3	151,7	219,1
65,096	337,59	52,252	365,2	173,57	222,86
71,664	339,39	57,503	367,14	195,45	225,33
78,231	340,6	62,754	368,43	217,32	226,94
84,798	341,4	68,005	369,29	239,19	228
91,365	341,93	73,256	369,86	261,06	228,69

97,933	342,29	78,507	370,24	282,94	229,14
104,5	342,53	83,758	370,49	304,81	229,44
111,07	342,68	89,009	370,66	317,41	229,57
117,63	342,79	94,259	370,77	330	229,67
120	342,82	100	370,85		

Tabel B.2 Hasil Temperatur pada Simulasi Pemanasan Pelat Empat Lapis

Al		Cu		Pb	
Waktu (detik)	Temperatur (°C)	Waktu (detik)	Temperatur (°C)	Waktu (detik)	Temperatur (°C)
1,5	50,476	1,2	52,732	5,4	42,281
3	73,467	2,4	77,758	7,2	47,796
7,5	128,16	6	137,28	9	53,138
16,337	199,7	13,065	215,11	14,4	67,853
25,201	247,51	20,152	267,12	30,6	102,82
34,063	279,37	27,239	301,78	46,8	130,46
42,926	300,6	34,326	324,87	77,22	164,89
51,789	314,75	41,413	340,26	106,85	187,18
60,652	324,18	48,5	350,52	135,92	201,75
69,515	330,46	55,586	357,35	164,98	211,38
78,377	334,64	62,673	361,91	194,04	217,74
87,24	337,43	69,76	364,94	223,11	221,93
96,103	339,29	76,847	366,96	252,17	224,69

104,97	340,53	83,934	368,31	281,24	226,51
113,83	341,35	91,02	369,21	310,3	227,71
122,69	341,9	98,107	369,81	339,37	228,49
131,55	342,27	105,19	370,2	368,43	229,01
140,42	342,51	112,28	370,47	397,5	229,35
145,21	342,62	116,14	370,58	426,56	229,57
150	342,7	120	370,67	455,63	229,72
				484,69	229,81
				513,76	229,88
				540	229,92

Tabel B.3 Hasil *Heat Flux* pada Simulasi Pemanasan Pelat Tiga Lapis

Al		Cu		Pb	
Waktu (detik)	<i>Heat Flux</i> (W/mm ²)	Waktu (detik)	Temperatur (°C)	Waktu (detik)	<i>Heat Flux</i> (W/mm ²)
1,2	0,10758	1	0,20464	3,3	1,04E-02
2,4	0,10924	2	0,20697	4,4	1,08E-02
6	9,20E-02	5	0,17253	5,5	1,10E-02
12,557	6,38E-02	10,243	0,11955	8,8	1,08E-02
19,126	4,34E-02	15,495	8,12E-02	18,7	9,28E-03
25,693	2,92E-02	20,746	5,46E-02	41,799	6,29E-03
32,26	1,95E-02	25,997	3,66E-02	64,207	4,20E-03
38,827	1,31E-02	31,248	2,44E-02	86,08	2,79E-03

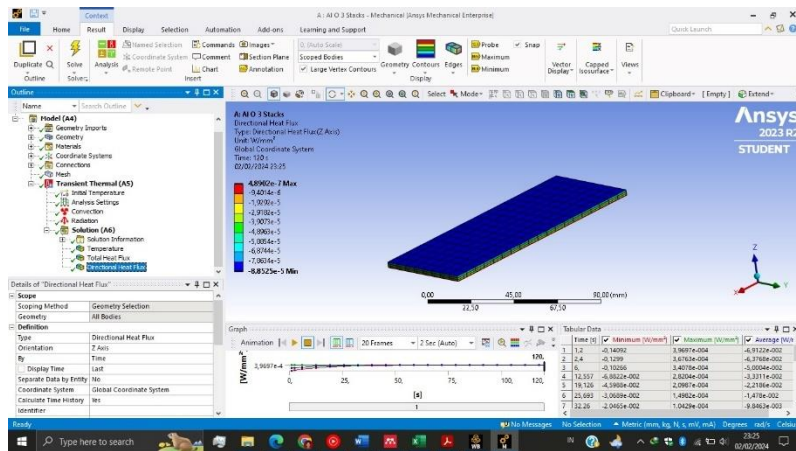
45,395	8,71E-03	36,499	1,63E-02	107,95	1,84E-03
51,962	5,81E-03	41,75	1,09E-02	129,83	1,21E-03
58,529	3,87E-03	47,001	7,25E-03	151,7	7,95E-04
65,096	2,58E-03	52,252	4,83E-03	173,57	5,21E-04
71,664	1,72E-03	57,503	3,22E-03	195,45	3,41E-04
78,231	1,15E-03	62,754	2,15E-03	217,32	2,23E-04
84,798	7,63E-04	68,005	1,43E-03	239,19	1,46E-04
91,365	5,09E-04	73,256	9,52E-04	261,06	9,57E-05
97,933	3,39E-04	78,507	6,35E-04	282,94	6,26E-05
104,5	2,26E-04	83,758	4,23E-04	304,81	4,10E-05
111,07	1,50E-04	89,009	2,82E-04	317,41	3,14E-05
117,63	1,00E-04	94,259	1,88E-04	330	2,41E-05
120	8,49E-05	100	1,21E-04		

Tabel B.4 Hasil *Heat Flux* pada Simulasi Pemanasan Pelat Empat Lapis

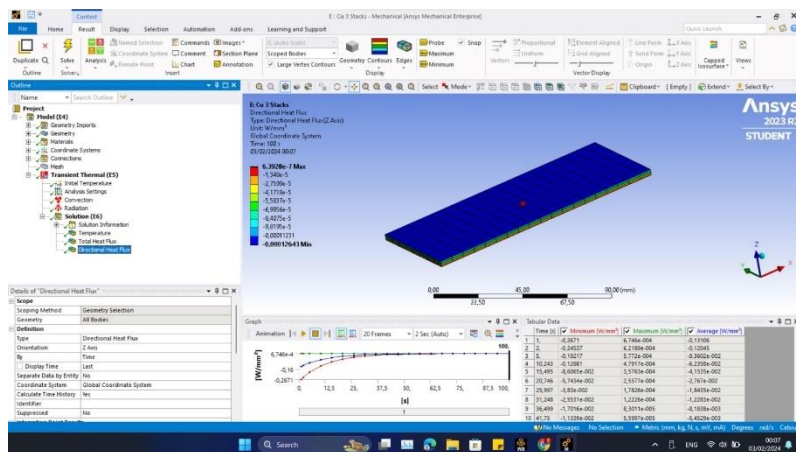
Al		Cu		Pb	
Waktu (detik)	<i>Heat Flux</i> (W/mm ²)	Waktu (detik)	Temperatur (°C)	Waktu (detik)	<i>Heat Flux</i> (W/mm ²)
1,5	0,10368	1,2	0,19719	5,4	1,00E-02
3	0,10641	2,4	0,20236	7,2	1,04E-02
7,5	9,15E-02	6	0,17408	9	1,05E-02
16,337	6,37E-02	13,065	0,12112	14,4	1,02E-02
25,201	4,32E-02	20,152	8,22E-02	30,6	8,42E-03

34,063	2,91E-02	27,239	5,53E-02	46,8	6,76E-03
42,926	1,95E-02	34,326	3,70E-02	77,22	4,51E-03
51,789	1,30E-02	41,413	2,47E-02	106,85	2,99E-03
60,652	8,66E-03	48,5	1,65E-02	135,92	1,98E-03
69,515	5,77E-03	55,586	1,10E-02	164,98	1,31E-03
78,377	3,85E-03	62,673	7,32E-03	194,04	8,62E-04
87,24	2,56E-03	69,76	4,88E-03	223,11	5,67E-04
96,103	1,71E-03	76,847	3,25E-03	252,17	3,73E-04
104,97	1,14E-03	83,934	2,17E-03	281,24	2,45E-04
113,83	7,58E-04	91,02	1,44E-03	310,3	1,61E-04
122,69	5,05E-04	98,107	9,61E-04	339,37	1,06E-04
131,55	3,37E-04	105,19	6,40E-04	368,43	6,97E-05
140,42	2,24E-04	112,28	4,27E-04	397,5	4,58E-05
145,21	1,77E-04	116,14	3,35E-04	426,56	3,01E-05
150	1,39E-04	120	2,63E-04	455,63	1,98E-05
				484,69	1,30E-05
				513,76	8,56E-06
				540	5,82E-06

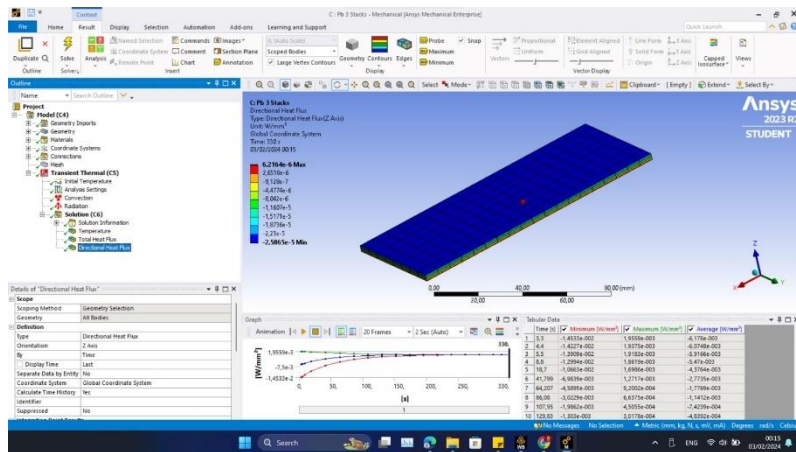
B.2 Gambar Simulasi Pencanaan dan Radiasi



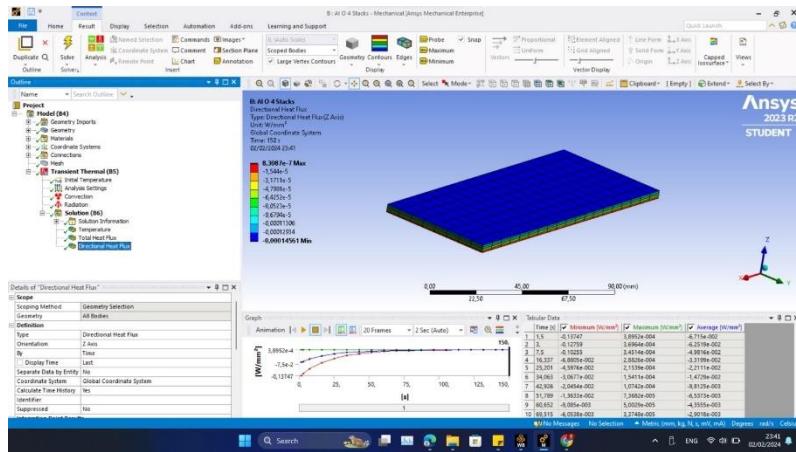
Gambar B.1 Hasil Simulasi Pemanasan Aluminium Tiga Lapis



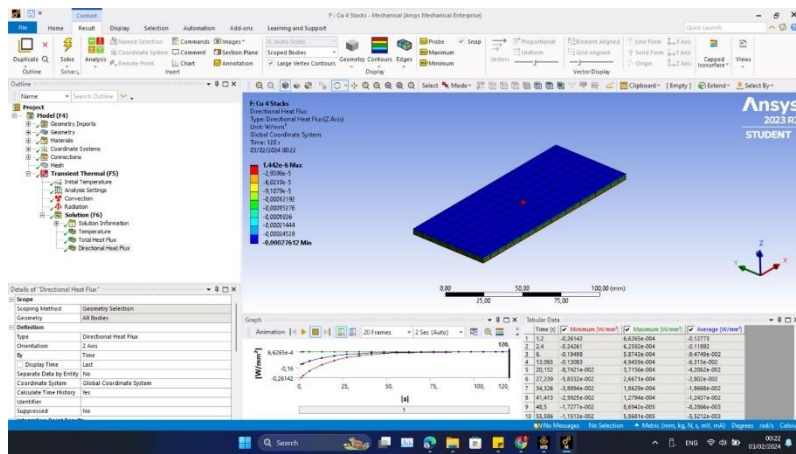
Gambar B.2 Hasil Simulasi Pemanasan Tembaga Tiga Lapis



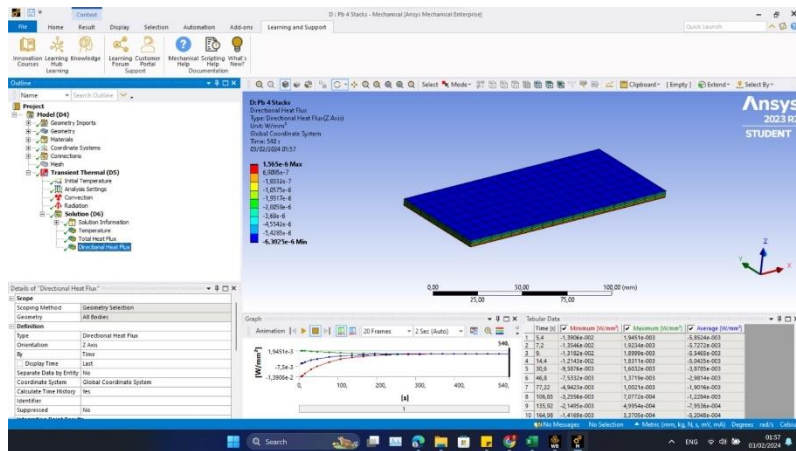
Gambar B.3 Hasil Simulasi Pemanasan Timbal Tiga Lapis



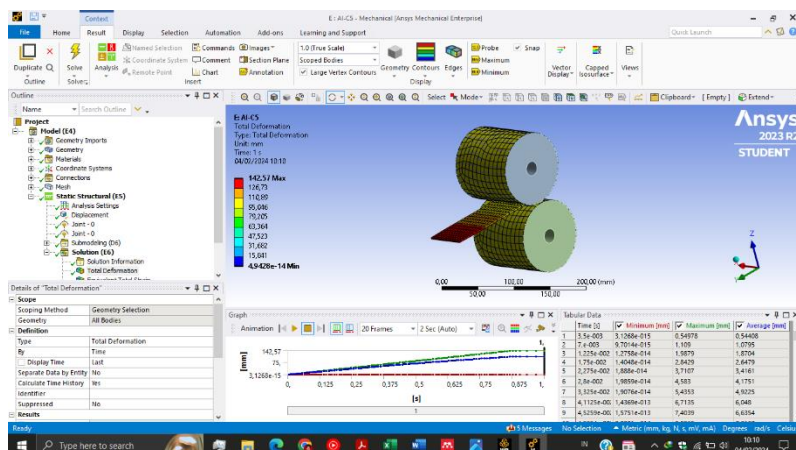
Gambar B.4 Hasil Simulasi Pemanasan Aluminium Empat Lapis



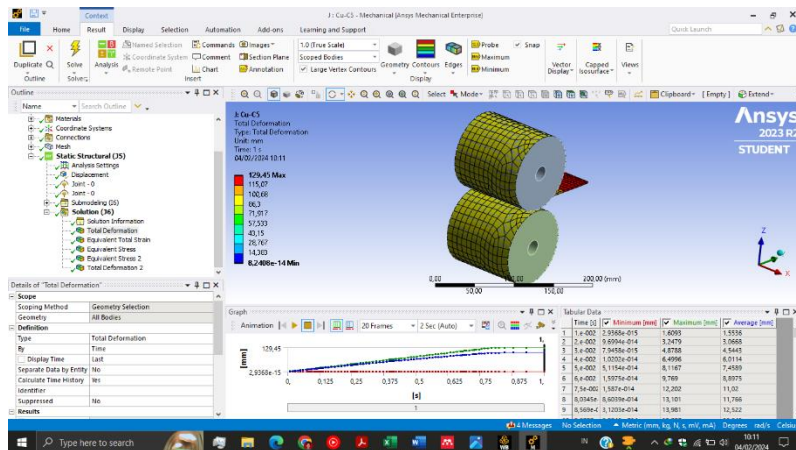
Gambar B.5 Hasil Simulasi Pemanasan Tembaga Empat Lapis



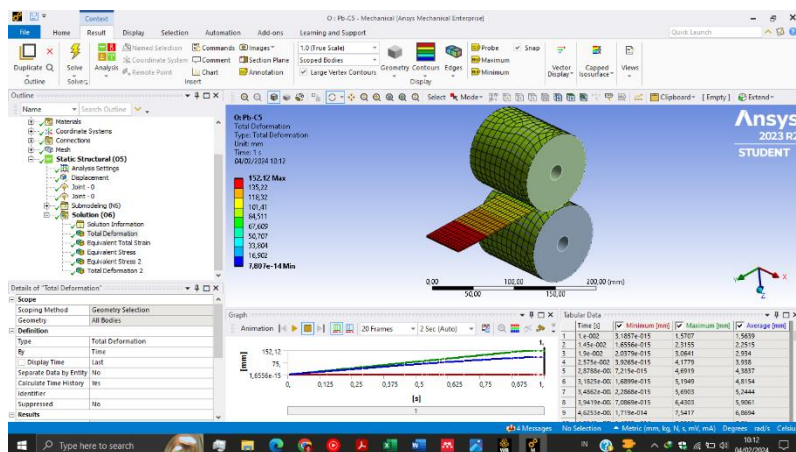
Gambar B.6 Hasil Simulasi Pemanasan Timbal Empat Lapis



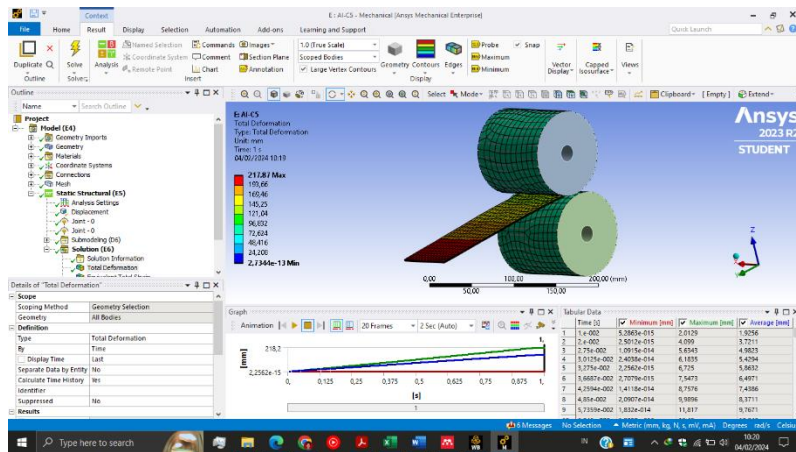
Gambar B.7 Hasil Simulasi Pencanaian Aluminium Tiga Lapis



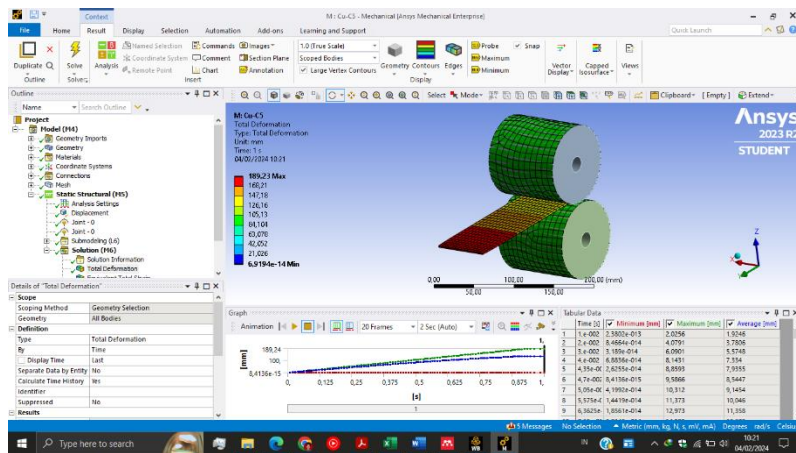
Gambar B.8 Hasil Simulasi Pencanaan Tembaga Tiga Lapis



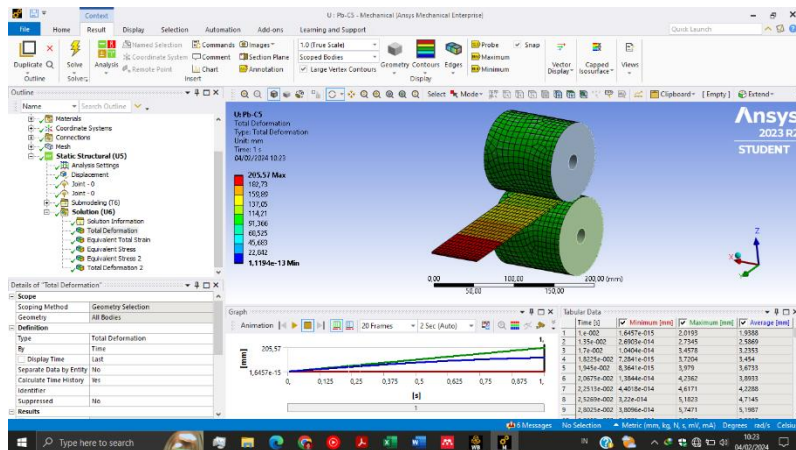
Gambar B.9 Hasil Simulasi Pencanaan Timbal Tiga Lapis



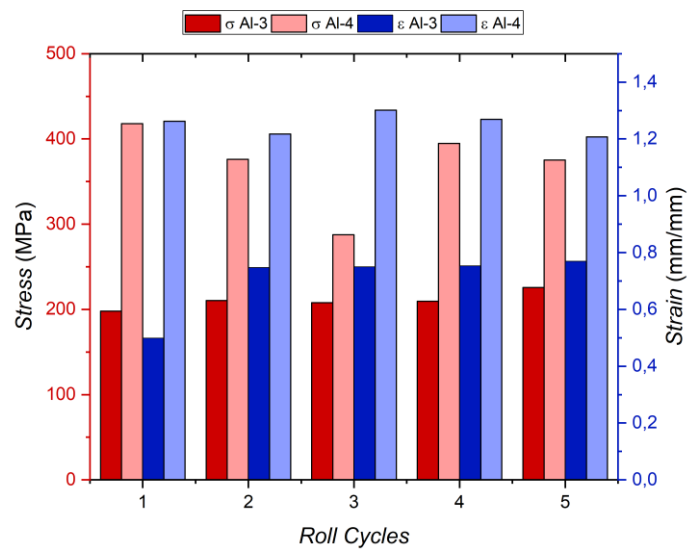
Gambar B.10 Hasil Simulasi Pencanaian Aluminium Empat Lapis



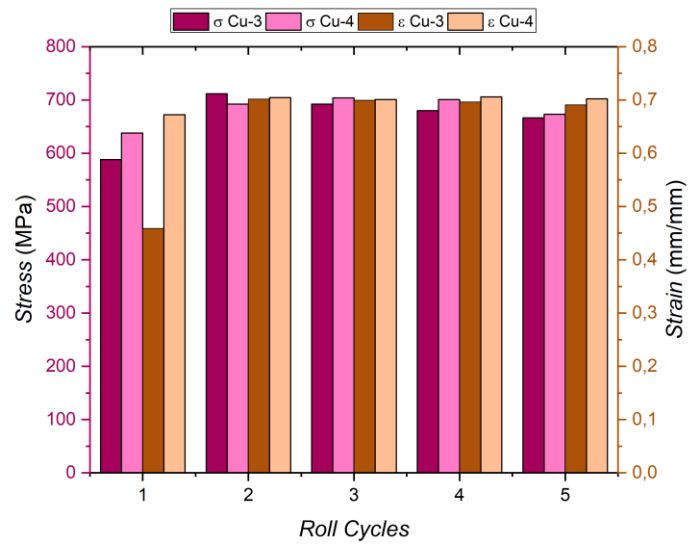
Gambar B.11 Hasil Simulasi Pencanaian Tembaga Empat Lapis



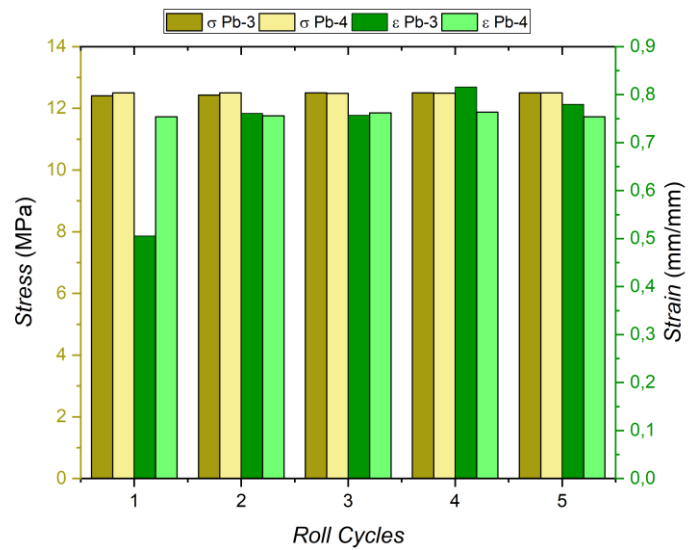
Gambar B.12 Hasil Simulasi Pencanaan Timbal Empat Lapis



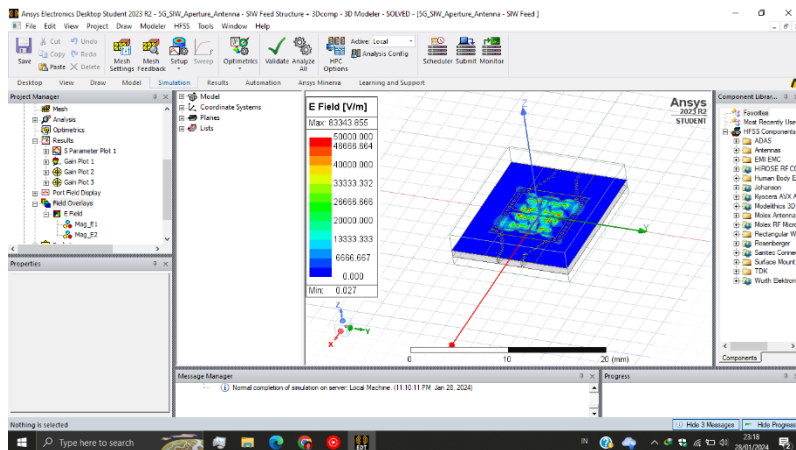
Gambar B.13 Grafik Hasil *Stress-Strain* Al Tiga Lapis dan Empat Lapis



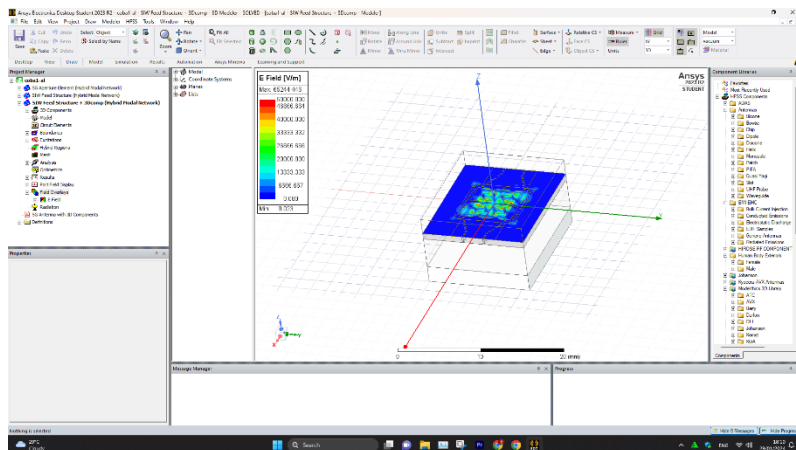
Gambar B.14 Grafik Hasil *Stress-Strain* Cu Tiga Lapis dan Empat Lapis



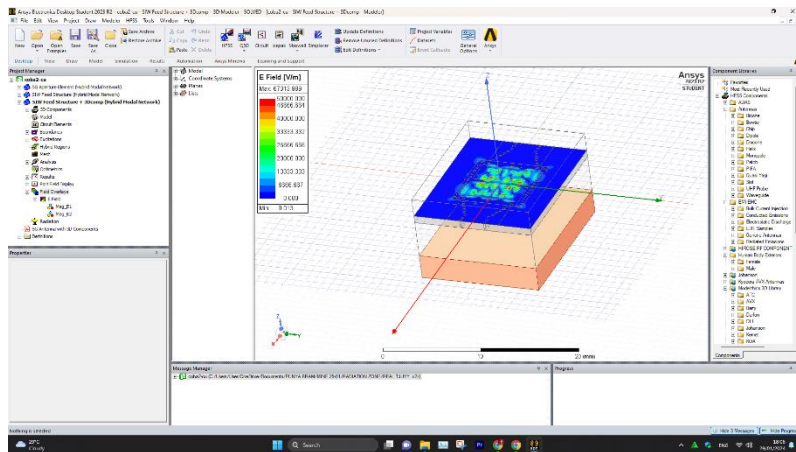
Gambar B.15 Grafik Hasil *Stress-Strain* Pb Tiga Lapis dan Empat Lapis



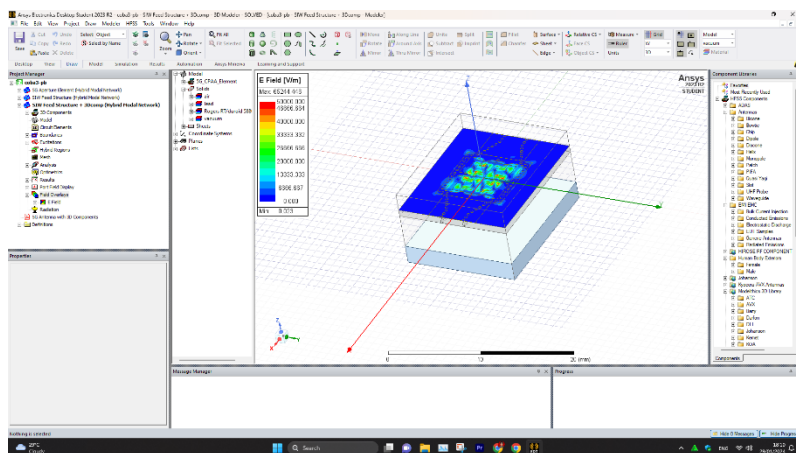
Gambar B.16 Hasil Simulasi Radiasi Antena



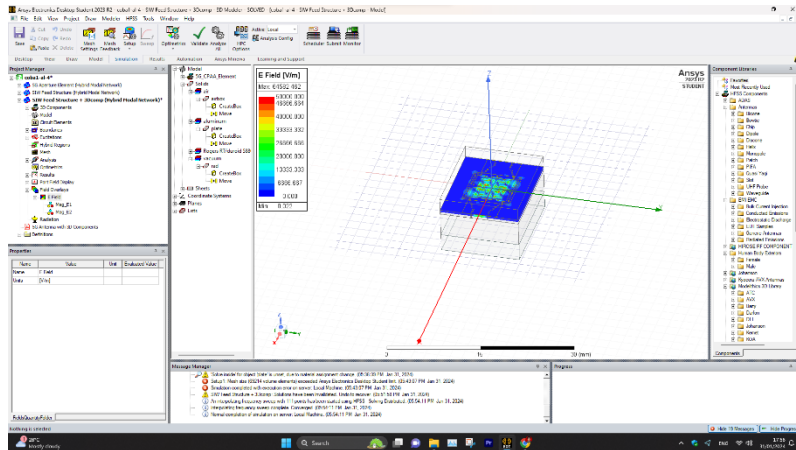
Gambar B.17 Hasil Simulasi Radiasi Aluminium Tiga Lapis



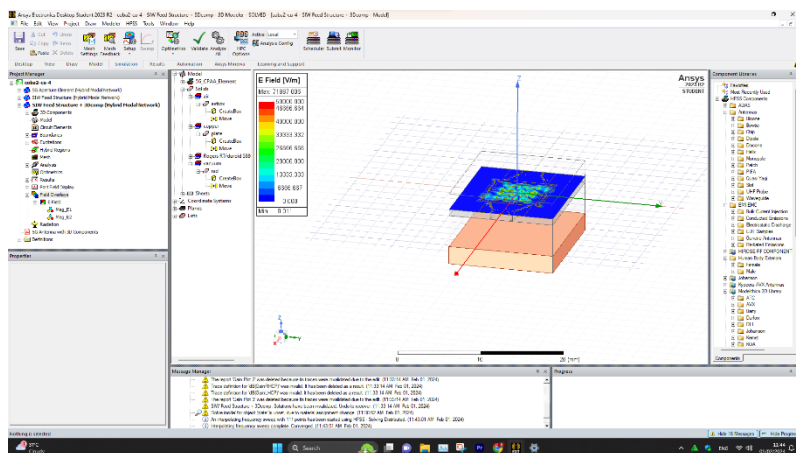
Gambar B.18 Hasil Simulasi Radiasi Tembaga Tiga Lapis



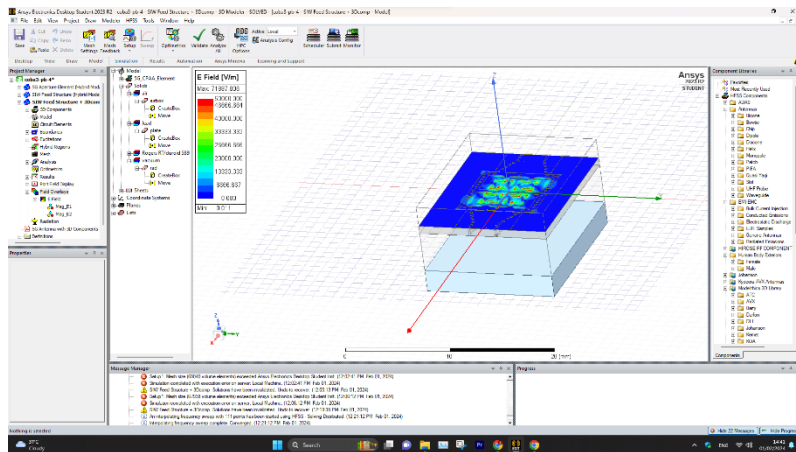
Gambar B.19 Hasil Simulasi Radiasi Timbal Tiga Lapis



Gambar B.20 Hasil Simulasi Radiasi Aluminium Empat Lapis



Gambar B.21 Hasil Simulasi Radiasi Tembaga Empat Lapis



Gambar B.22 Hasil Simulasi Radiasi Timbal Empat Lapis

LAMPIRAN C

GAMBAR ALAT DAN KOMPONEN

Lampiran C. Gambar Alat dan Komponen

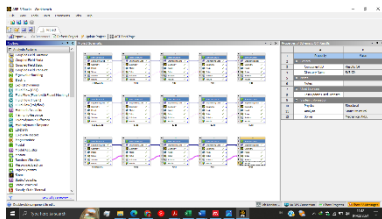
C.1 Gambar Alat yang Digunakan



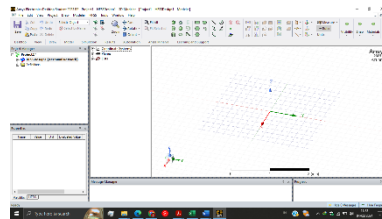
Gambar C.1 Jaringan Internet



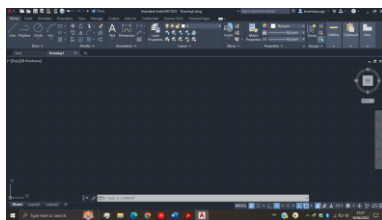
Gambar C.2 Komputer



Gambar C.3 ANSYS R2 2023

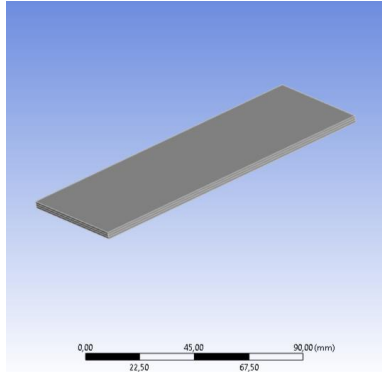


Gambar C.4 ANSYS HFSS

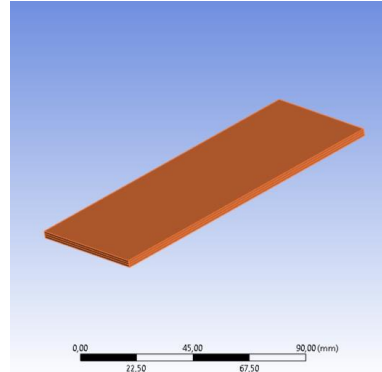


Gambar C.5 AutoCAD 2022

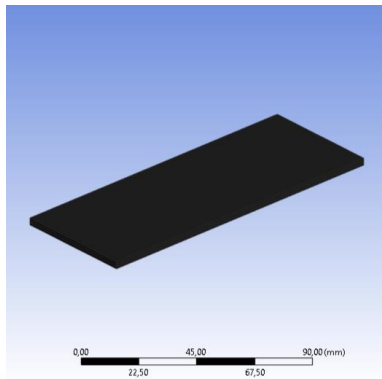
C.2 Gambar Komponen yang Digunakan



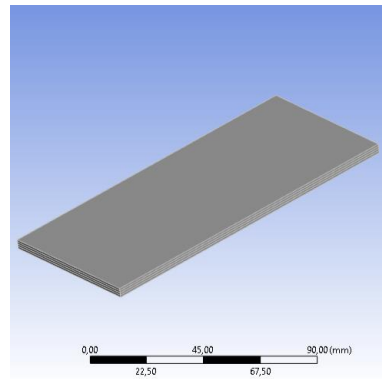
Gambar C.6 Pelat Al 3 Lapis



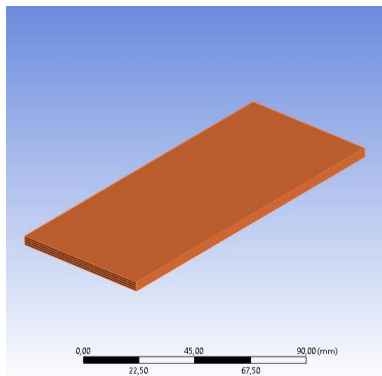
Gambar C.7 Pelat Cu 3 Lapis



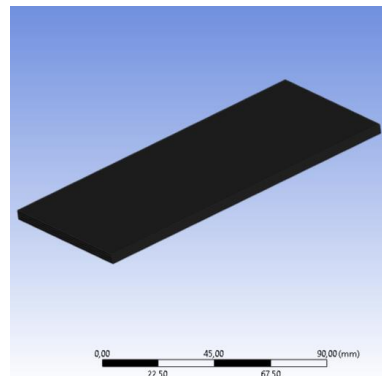
Gambar C.8 Pelat Pb 3 Lapis



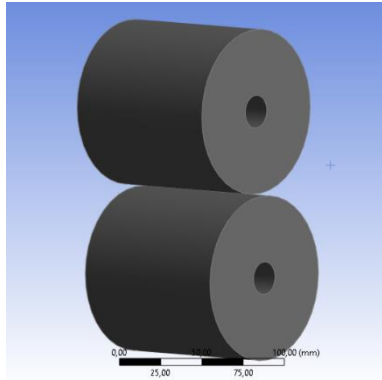
Gambar C.9 Pelat Al 4 Lapis



Gambar C.10 Pelat Cu 4 Lapis



Gambar C.11 Pelat Pb 4 Lapis



Gambar C.12 *Roller*