

DAFTAR ISI

LEMBAR PERSETUJUAN.....	i
LEMBAR PENGESAHAN.....	ii
LEMBAR PERNYATAAN.....	iii
KATA PENGANTAR	iv
ABSTRAK.....	v
ABSTRACT.....	vi
DAFTAR GAMBAR	ix
DAFTAR TABEL	xi
BAB I PENDAHULUAN	1
1.1. Latar Belakang.....	1
1.2. Rumusan Masalah	2
1.3. Tujuan Penelitian.....	2
1.4. Manfaat.....	2
1.5. Batasan Masalah.....	2
1.6. Asumsi.....	2
BAB II.....	3
TINJAUAN PUSTAKA	3
2.1. Artikel Review	3
2.2. Klasifikasi Baja	5
2.3. Sifat – Sifat Mekanik	6
2.3.1 <i>Tensile Strength</i>	7
2.3.2 <i>Elastisitas</i>	7
2.3.3 <i>Hardness</i>	7
2.4 Die & Punch Deep Drawing.....	7
2.4.1 <i>Deep Drawing Die</i>	7
2.4.2 <i>Punch Deep Drawing</i>	8
2.5 Klasifikasi deformasi	8
2.6 Proses Metal Forming dan Rumus - rumus yang Digunakan.....	9
2.6.1 <i>Perhitungan Dimensi Blank (D)</i>	10
2.6.2 <i>Deep Drawing Ratio</i>	11
2.6.3 <i>Perhitungan Drawing Force</i>	12
2.6.3 <i>Perhitungan Work Drawing</i>	12
2.7 Perhitungan Desain Punch dan Die Deep Drawing.....	13

2.7.1.	<i>Perhitungan Celah dan Toleransi</i>	13
2.7.2.	<i>Kalkulasi Dimensi Punch dan Die</i>	13
2.7.3.	<i>Panjang Punch</i>	15
2.7.4.	<i>Defleksi</i>	16
3.2.	Alat dan Bahan	18
3.2.1.	<i>Alat</i>	18
3.2.2.	<i>Bahan</i>	20
3.3.	Waktu dan Tempat Penelitian	22
3.3.1.	<i>Tempat penelitian</i>	22
BAB IV	.....	23
HASIL DAN PEMBAHASAN	.....	23
4.1	Analisis Perhitungan <i>Punch</i> dan <i>Die</i>	23
4.2	Rancangan Cetakan <i>Deep Drawing</i>	23
4.3	Perhitungan Spesifikasi <i>Deep Drawing</i>	26
4.3.1	<i>Diameter Blank (D)</i>	26
4.3.2	<i>Deep Drawing Ratio (β)</i>	26
4.3.3	<i>Drawing Force (N)</i>	27
4.3.4	<i>Work Drawing (Nm)</i>	27
4.3.5	<i>Ukuran Celah</i>	28
4.3.6	<i>Ukuran Die</i>	28
4.3.7	<i>Ukuran Punch</i>	28
4.4	Simulasi proses <i>Deep Drawing</i>	29
BAB V	.....	48
KESIMPULAN DAN SARAN	.....	48
5.1	<i>Kesimpulan</i>	48
5.2	<i>Saran</i>	48
LAMPIRAN	.....	51
RIWAYAT PENULIS	.....	57

DAFTAR GAMBAR

Gambar 2.1. Grafik Deformasi	8
Gambar 2.2. Dimensi Blank	10
Gambar 3.1. <i>Flow chart</i> prosedur penelitian	17
Gambar 3.2. Mesin <i>Press</i>	18
Gambar 3.3. Jangka Sorong.....	19
Gambar 3.4. Mikrometer	19
Gambar 3.5. <i>Die</i>	20
Gambar 3.6. <i>Punch</i>	20
Gambar 3.7. Material JIS G3141 SPCC SD 0,8 mm	20
Gambar 3.8. Pelumas.....	22
Gambar 4.1. <i>Die</i>	23
Gambar 4.2. <i>punch</i>	23
Gambar 4.3. <i>Guide post</i>	24
Gambar 4.4. <i>Die spring</i>	24
Gambar 4.5. <i>Guide spring</i>	24
Gambar 4.6. <i>Upper plate</i>	25
Gambar 4.7. <i>Bottom plate</i>	25
Gambar 4.8. <i>Dies square cup</i>	25
Gambar 4.9 Hasil simulasi	30
Gambar 4.10 Elemen produk.....	30
Gambar 4.11 Grafik <i>displacement vs thickness</i> elemen 145	31
Gambar 4.12 Grafik <i>displacement vs thickness</i> elemen 144	32
Gambar 4.13 Grafik <i>Displacement vs Thickness</i> Elemen 133.....	33
Gambar 4.14 Grafik <i>Displacement vs Thickness</i> Elemen 122.....	34
Gambar 4.15 Grafik <i>Displacement vs Thickness</i> Elemen 111.....	35
Gambar 4.16 Grafik <i>Displacement vs Thickness</i> Elemen 100.....	36
Gambar 4.17 Grafik <i>Displacement vs Thickness</i> Elemen 89.....	37
Gambar 4.18 Grafik <i>Displacement vs Thickness</i> Elemen 78.....	38
Gambar 4.19 Grafik <i>Displacement vs Thickness</i> Elemen 67.....	39
Gambar 4.20 Grafik <i>Displacement vs Thickness</i> Elemen 56.....	40
Gambar 4.21 Grafik <i>Displacement vs Thickness</i> Elemen 45.....	41
Gambar 4.22 Grafik <i>Displacement vs Thickness</i> Elemen 34	42
Gambar 4.23 Grafik <i>Displacement vs Thickness</i> Elemen 23	43

Gambar 4.24 Bagian benda yang dilakukan pengukuran *thickness*..... 44
Gambar 4.25 Grafik Sampel 1 vs *Thickness Numerical*..... 44
Gambar 4.26 Grafik Sampel 2 vs *Thickness Numerical*..... 45
Gambar 4.27 Grafik Sampel 3 vs *Thickness Numerical*..... 46
Gambar 4.28 Grafik Sampel 4 vs *Thickness Numerical*..... 46
Gambar 4.29 Grafik Sampel 5 vs *Thickness Numerical*..... 47



DAFTAR TABEL

Tabel 2.1. Persentase Karbon Dalam Baja Karbon	6
Tabel 2.2. Perhitungan nilai c	11
Tabel 2.4. Nilai koefisien k untuk bahan yang berbeda.....	13
Tabel 2.5. ketebalan material	14
Tabel 3.1. Sifat-sifat mekanik pelat SPCC-SD	21
Tabel 3.2. Komposisi kimia pelat SPCC-SD	21
Tabel 3.3. Jadwal Penelitian	22
Tabel 4.1. Data Simulasi.....	29
Tabel 4.2 Data <i>Displacement vs Thickness</i> Elemen 145	30
Tabel 4.3 Data <i>Displacement vs Thickness</i> Elemen 144	31
Tabel 4.4 Data <i>Displacement vs Thickness</i> Elemen 133	32
Tabel 4.5 Data <i>Displacement vs Thickness</i> Elemen 122	33
Tabel 4.6 Data <i>Displacement vs Thickness</i> Elemen 111	34
Tabel 4.7 Data <i>Displacement vs Thickness</i> Elemen 100	35
Tabel 4.8 Data <i>Displacement vs Thickness</i> Elemen 89	36
Tabel 4.9 Data <i>Displacement vs Thickness</i> Elemen 78	37
Tabel 4.10 Data <i>Displacement vs Thickness</i> Elemen 67	38
Tabel 4.11 Data <i>Displacement vs Thickness</i> Elemen 56	39
Tabel 4.12 Data <i>Displacement vs Thickness</i> Elemen 45	40
Tabel 4.13 Data <i>Displacement vs Thickness</i> Elemen 34	41
Tabel 4.14 Data <i>Displacement vs Thickness</i> Elemen 23	42
Tabel 4.15 Data Sampel 1 vs <i>Thickness Numerical</i>	44
4.16 Data Sampel 2 vs <i>Thickness Numerical</i>	45
Tabel 4.17 Data Sampel 3 vs <i>Thickness Numerical</i>	45
Tabel 4.18 Data Sampel 4 vs <i>Thickness Numerical</i>	46
Tabel 4.19 Data Sampel 5 vs <i>Thickness Numerical</i>	47