LAMPIRAN

Lampiran 1

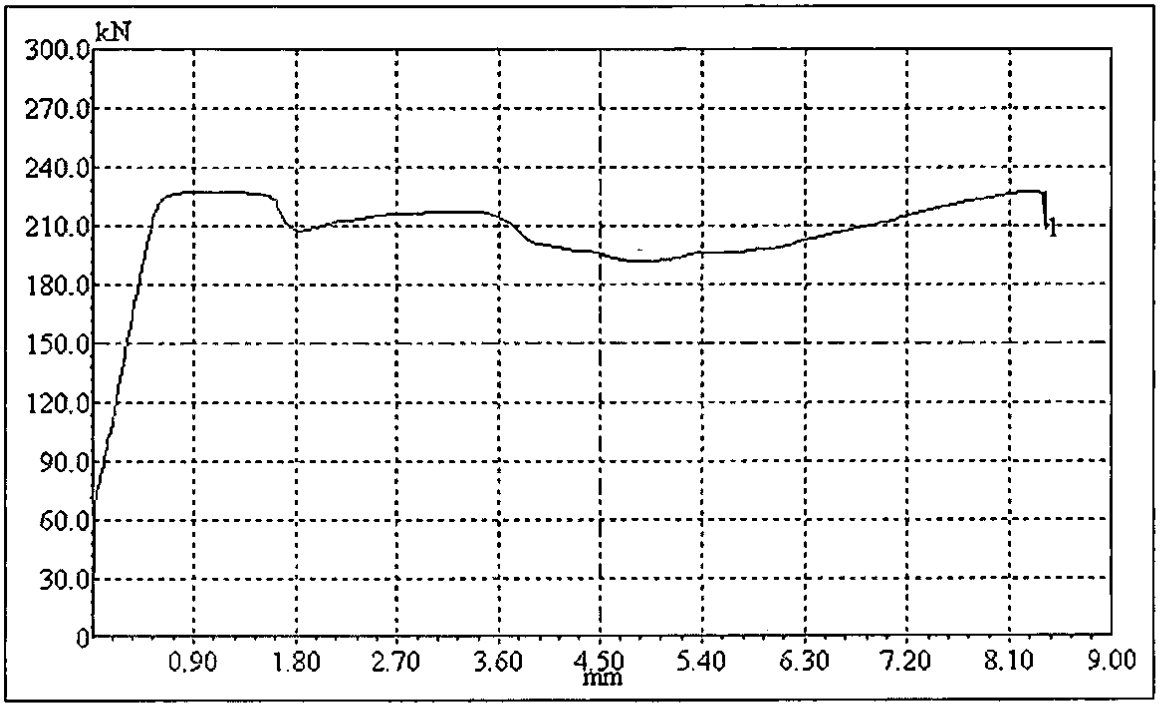
LABORATORIUM JURUSAN TEKNIK MESIN

UNIVERSITAS MUHAMMADIYAH YOGYAKARTA

Almunium Foam

Variasi NaCl 0 %

Test date	Area	Yield point	Max. Load	Break
	mm^2	kN	kN	kN
2007-01-	804.248	227.163	227.649	217.129



Yogyakarta, 11 November 2015

Kepala Laboratorium

Material Teknik

(Sudarisman, Ph.D.)

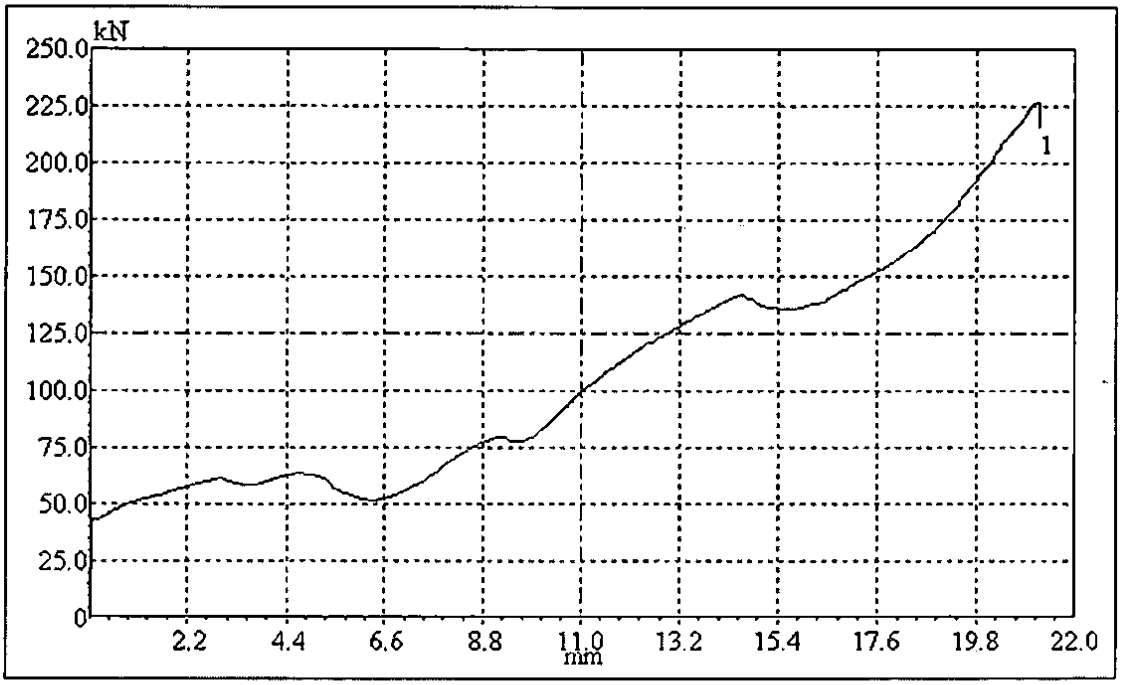
LABORATORIUM JURUSAN TEKNIK MESIN

UNIVERSITAS MUHAMMADIYAH YOGYAKARTA

Almunium Foam

Variasi NaCl 10 %

Test date	Area	Yield point	Max. Load	Break
	mm^2	kN	kN	kN
2007-01-	78.540	141.383	226.651	215.427



Yogyakarta, 11 November 2015

Kepala Laboratorium

Material Teknik

(Sudarisman, Ph.D.)

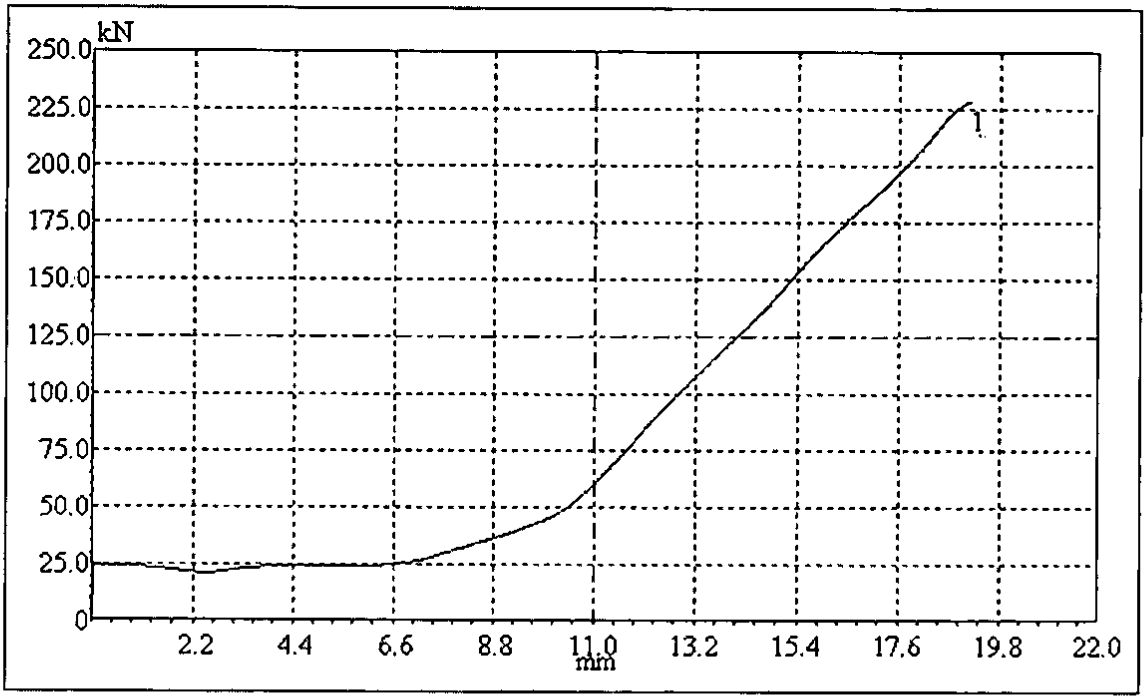
LABORATORIUM JURUSAN TEKNIK MESIN

UNIVERSITAS MUHAMMADIYAH YOGYAKARTA

Almunium Foam

Variasi NaCl 15 %

Test date	Area	Yield point	Max. Load	Break
	mm^2	kN	kN	kN
2007-01	881.413	228.279	228.283	227.614



Yogyakarta, 11 November 2015

Kepala Laboratorium

Material Teknik

(Sudarisman, Ph.D.)

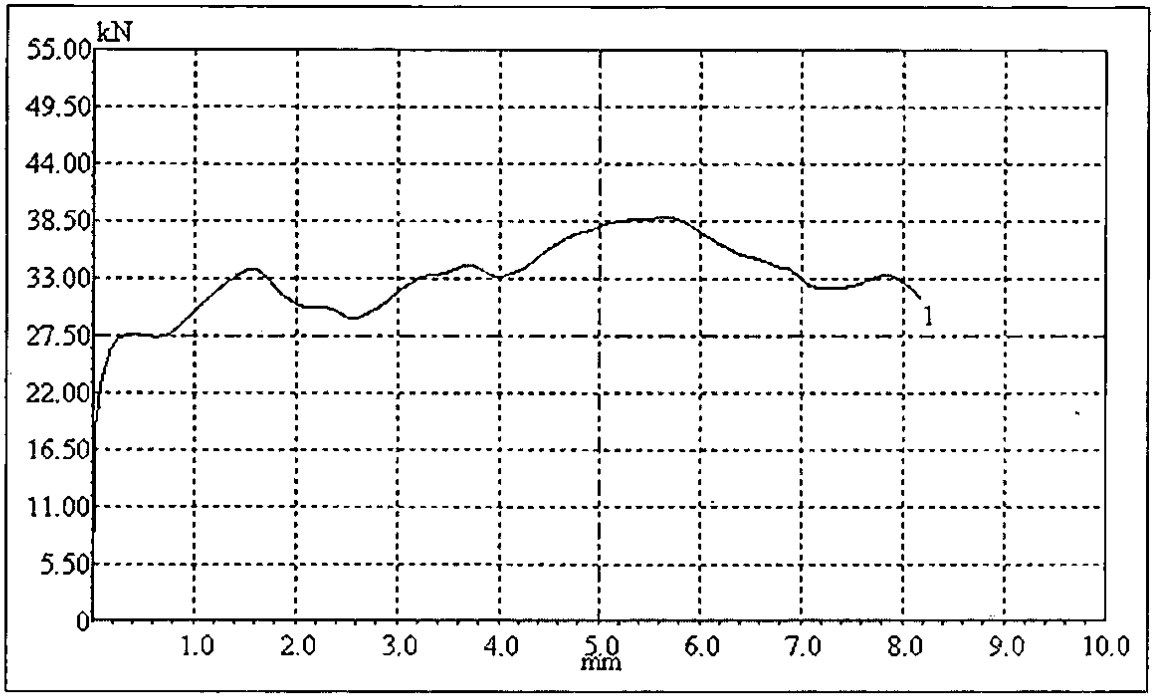
LABORATORIUM JURUSAN TEKNIK MESIN

UNIVERSITAS MUHAMMADIYAH YOGYAKARTA

Almunium Foam

Variasi NaCl 20 %

Test date	Area	Yield point	Max. Load	Break
	mm^2	kN	kN	kN
2007-01-	881.413	27.638	38.887	31.099



Yogyakarta, 11 November 2015

Kepala Laboratorium

Material Teknik

(Sudarisman, Ph.D.)

Lampiran 2

Perhitungan Densitas dan Porositas

Spesimen	Massa Kering (gram)	Volume (Cm^3)	Massa Jenis (g/cm^3)	Massa Jenis Al (g/cm^3)	Porositas (%)
0	81	30,85	2,63	2,7	2,8
10	70	30,36	2,31	2,7	14,6
15	63	30,87	2,04	2,7	24,4
20	56	30,85	1,82	2,7	32,8

1) Spesimen 0%

Densitas:

$\rho = m/v$

$= 81/30,85$

$= 2,63\ g/cm^3$

Porositas :

$$\text{Porositas} = \frac{\rho.Al - \rho.foam}{\rho.Al} x100\%$$

$$= \frac{2,7 - 2,63}{2,7} x100\%$$

$=2,8\%$

2) Spesimen 10%

Densitas:

$\rho = m/v$

$= 70/30,36$

$= 2,31\ g/cm^3$

Porositas :

$$\text{Porositas} = \frac{\rho.Al - \rho.foam}{\rho.Al} x100\%$$

$$= \frac{2,7 - 2,31}{2,7} x100\%$$

$= 14,6\%$

3) Spesimen 15 %

Densitas:

$\rho = m/v$

$= 63/30,87$

$= 2,04\ g/cm^3$

Porositas :

$$\text{Porositas} = \frac{\rho.Al - \rho.foam}{\rho.Al} x100\%$$

$$= \frac{2,7 - 2,04}{2,7} x100\%$$

$=24,4\%$

4) Spesimen 20%

Densitas:

$\rho = m/v$

$= 56/30,85$

$= 1,82\ g/cm^3$

Porositas :

$$\text{Porositas} = \frac{\rho.Al - \rho.foam}{\rho.Al} x100\%$$

$$= \frac{2,7 - 1,82}{2,7} x100\%$$

$=32,8\%$

Lampiran 3

Perhitungan Tegangan Luluh

Spesimen	*Yield Point* (kN)	A_o (mm^2)	Tegangan Luluh (MPa)
0	227,163	881,413	257,7
10	141,383	855,299	165,3
15	228,279	907,920	251,4
20	27,638	881,413	31,4

$$Ys = \frac{Py}{Ao}$$

Keterangan ; Ys : Besarnya tegangan luluh (kN/mm^2)

Py : Besarnya beban di titik *yield* (kN)

Ao : Luas penampang awal benda uji (mm^2)

1) **Spesimen 0%**

Modulus Elastisitas :

$$Ys = \frac{Py}{Ao}$$

$$= \frac{227,163}{881,413}$$

$=0,2577$ kN/ mm^2 x 1000

=257,7 MPa

2) **Spesimen 10%**

Modulus Elastisitas :

$$Ys = \frac{Py}{Ao}$$

$$= \frac{141,383}{855,299}$$

$=0,1653$ kN/ mm^2 x 1000

=165,3 MPa

3) **Spesimen 10%**

Modulus Elastisitas :

$$Ys = \frac{Py}{Ao}$$

$$= \frac{228,279}{907,920}$$

$=0,2514$ kN/ mm^2 x 1000

=251,4 MPa

4) **Spesimen 20%**

Modulus Elastisitas :

$$Ys = \frac{Py}{Ao}$$

$$= \frac{27,638}{881,413}$$

$=0,0314$kN/ mm^2 x 1000

=31,4 MPa

Lampiran 4

Perhitungan Modulus Elastisitas

Spesimen	*Yield Point* (kN)	Lo (t) (mm)	A_o (mm^2)	Delta l	E (MPa)
0	227,163	35,0	881,413	26,5	239,4
10	141,383	35,5	855,299	14,4	84,4
15	228,279	34,0	907,920	14,9	127,0
20	27,638	35,0	881,413	26,8	29,4

$$E = \frac{F \cdot Lo}{Ao \cdot \Delta L}$$

Keterangan : E = modulus elastisitas/modulus Young (N/mm^2 = MPa)

Lo = panjang ukur awal spesimen (mm)

ΔL = perpanjangan yang terjadi (mm)

F = besar beban (kN)

Ao = luas awal penampang lintang batang uji (mm^2)

1) **Spesimen 0%**

Modulus Elastisitas :

$$E = \frac{F \cdot Lo}{Ao \cdot \Delta L}$$

$$= \frac{227,163 \cdot 35}{881,413 \cdot 26,5}$$

$$= 239,4 \text{ MPa}$$

2) **Spesimen 10%**

Modulus Elastisitas :

$$E = \frac{F \cdot Lo}{Ao \cdot \Delta L}$$

$$= \frac{141,383 \cdot 35,5}{855,299 \cdot 14,4}$$

$$= 84,4 \text{ MPa}$$

3) **Spesimen 10%**

Modulus Elastisitas :

$$E = \frac{F \cdot Lo}{Ao \cdot \Delta L}$$

$$= \frac{228,279 \cdot 34}{907,920 \cdot 14,9}$$

$$= 127,0 \text{ MPa}$$

4) **Spesimen 20%**

Modulus Elastisitas :

$$E = \frac{F \cdot Lo}{Ao \cdot \Delta L}$$

$$= \frac{27,638 \cdot 35}{881,413 \cdot 26,8}$$

$$= 29,4 \text{ MPa}$$