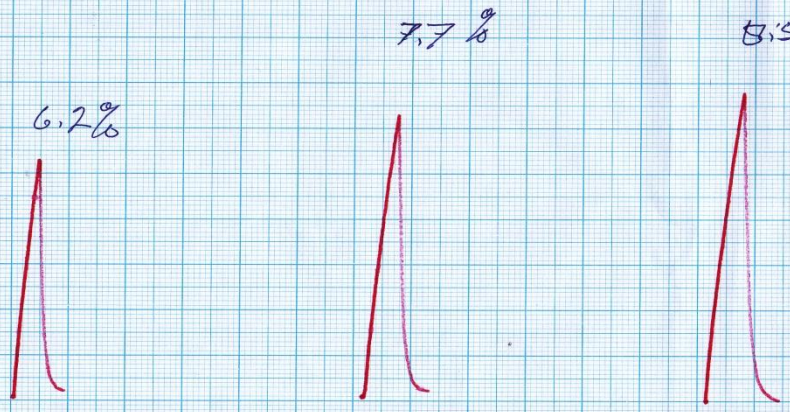
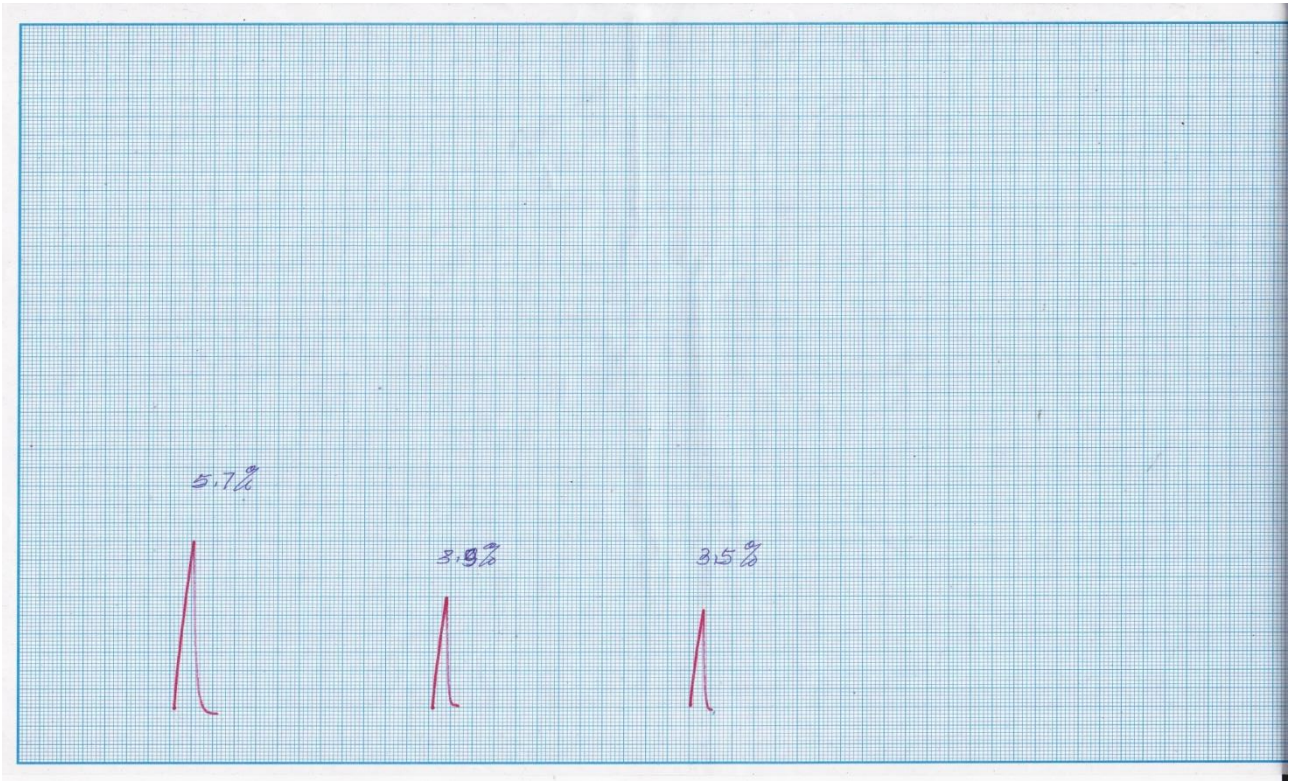
LAMPIRAN

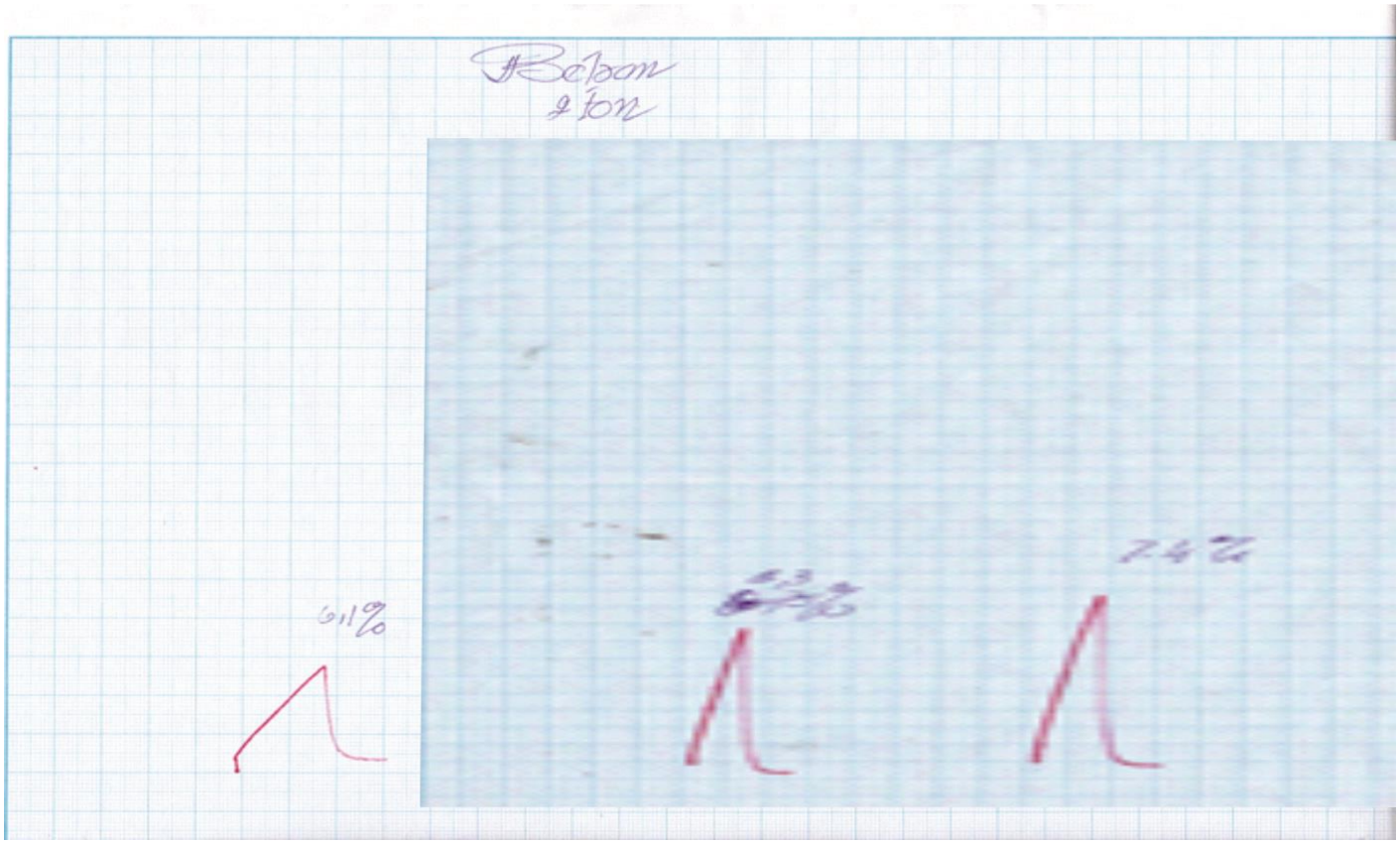
Beban yang terpasang
2 Ton

Jogjakarta, 15/03 - 2018
pengaji

Suwaji

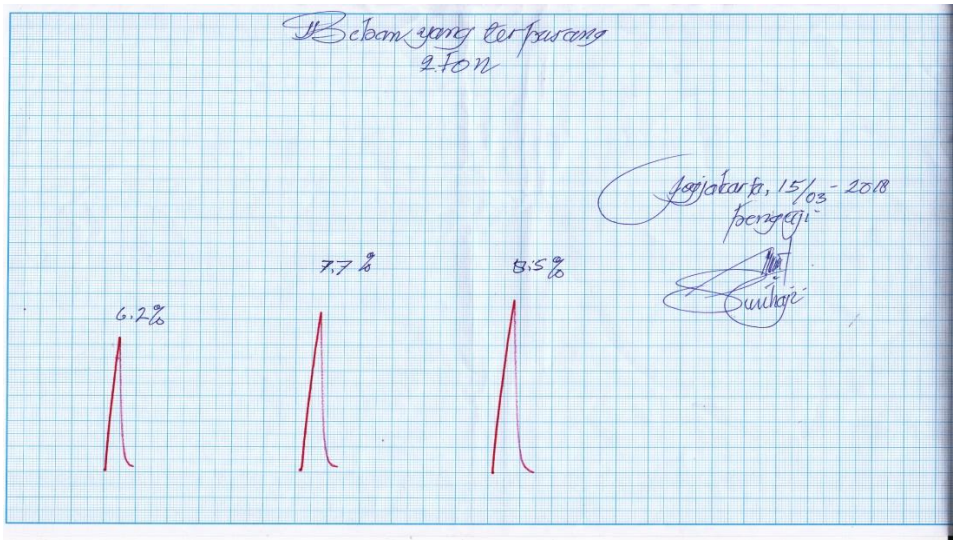



5.7%
3.9%
3.5%


Beton
2 ton
61%
74%

PengujianTarik

Perhitunganpengujiantarikkomposit hybrid serat rami anyam dan serat acak gelas dengan lapisan 1 alam (serat rami) 1 sintetis (fiber) metode*Vaccum Infusio*



1. SpesimenV1 (RF)
    a. Luaspenampangspecimen V1 (RF)

        Diketahui : Tebalspesimen (t) = 1,53 mm

        Lebarspesimen (l) = 15,04 mm

        Ditanyakan A (Luaspenampangspesimen) ?

        A = t x l

= 1,53 x 15,04

= 23,01 mm^2

b. TeganganspesimenV1 (RF)

$\sigma = \frac{F}{A}$

F = $\frac{6,2}{100}$ x 2000 kg x 9,8 m/s^2

F = 1215,2 N

Maka $\sigma = \frac{F}{A}$

$\sigma = \frac{1215,2}{18,4}$

σ = 52,80 N/mm^2

c. ReganganspesimenV1 (RF)

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{2}{166}$x 100

ε = 1,20 %

d. Modulus elastisitasspesimenV1 (RF)

E = $\frac{\sigma}{\varepsilon}$

E = $\frac{52,80}{1,20\ \%}$

E = 4383,15 N/mm^2 = 4,38GPa

2. SpesimenV2 (RF)

a. LuaspenampangspecimenV2 (RF)

Diketahui : Tebalspesimen (t) = 1,5 mm

Lebarspesimen (l) = 15,36 mm

Ditanyakan A (Luaspenampangspesimen) ?

A = t x l

= 1,5 x 15,36

= 23,04 mm^2

b. TeganganspesimenV2 (RF)

$\sigma = \frac{F}{A}$

F = $\frac{7,7}{100}$ x 2000 kg x 9,8 m/s^2

F = 1509,2 N

Maka $\sigma = \frac{F}{A}$

$\sigma = \frac{1509,2}{23,04}$

σ = 65,50 N/mm^2

c. ReganganspesimenVI 1

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{1}{166}$x 100

ε = 0,60 %

d. Modulus elastisitasspesimenVI 1

$E = \frac{\sigma}{\varepsilon}$

$E = \frac{65,50}{0,60\ \%}$

$E = 10873,57\ N/mm^2 = 10,87\ GPa$

3. SpesimenV3 (RF)

   a. Luaspenampangspecimen V1 (RF)

      Diketahui : Tebalspesimen (t) = 1,46 mm

      Lebarspesimen (l) = 14,9 mm

      Ditanyakan A (Luaspenampangspesimen) ?

      $A = t \times l$

      $= 1,46 \times 14,9$

      $= 21,75\ mm^2$

   b. TeganganspesimenV3 (RF)

      $\sigma = \frac{F}{A}$

      $F = \frac{8,5}{100} \times 2000\ kg \times 9,8\ m/s^2$

      $F = 1666\ N$

      Maka $\sigma = \frac{F}{A}$

      $\sigma = \frac{1666}{21,75}$

      $\sigma = 76,58\ N/mm^2$

   c. ReganganspesimenV3 (RF)

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{1}{166}$x 100

ε = 0,60 %

d. Modulus elastisitasspesimenVI 1

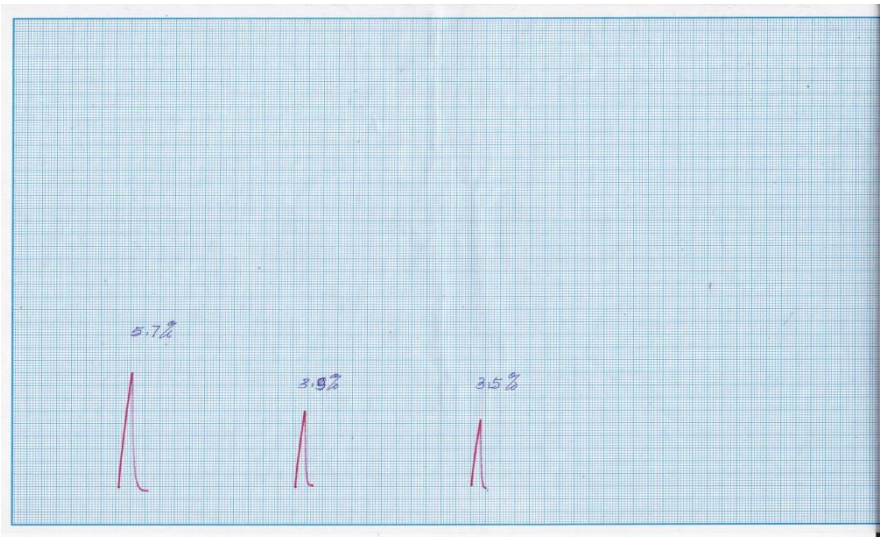
$E = \frac{\sigma}{\varepsilon}$

$E = \frac{76,58}{0,60\ \%}$

E = 12712,88 N/mm^2 = 12,71 GPa

Pengujian tarik

Perhitungan pengujian tarik pada komposit serat sitentis berlapis 2 serat acak glass mengunakan metode *vacuum infusion.*



1. SpesimenV1 (FF)
    a. LuaspenampangspecimenV1 (FF)

        Diketahui : Tebalspesimen (t) = 1,35 mm

        Lebarspesimen (l) = 14,03 mm

        Ditanyakan A (Luaspenampangspesimen) ?

        A = t x l

= 1,35 x 14,03

= 18,94 mm^2

b. TeganganspesimenV1 (FF)

$\sigma = \frac{F}{A}$

F = $\frac{5,7}{100}$ x 2000 kg x 9,8 m/s^2

F = 1117,2 N

Maka $\sigma = \frac{F}{A}$

$\sigma = \frac{1117,2}{18,94}$

σ = 58,98 N/mm^2

c. ReganganspesimenV1 (FF)

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{1}{168}$x 100

ε = 0,59 %

d. Modulus elastisitasspesimenV1 (FF)

E = $\frac{\sigma}{\varepsilon}$

E = $\frac{58,98}{0,59\ \%}$

E = 9909,4 N/mm^2 = 9,90 GPa

2. SpesimenV2 (FF)

a. Luaspenampangspecimen V2 (FF)

Diketahui : Tebalspesimen (t) = 1 mm

Lebarspesimen (l) = 13,82 mm

Ditanyakan A (Luaspenampangspesimen) ?

$A = t \times l$

$= 1 \times 13{,}82$

$= 13{,}82\ mm^2$

b. TeganganspesimenV2 (FF)

$\sigma = \frac{F}{A}$

$F = \frac{3{,}9}{100} \times 2000\ kg \times 9{,}8\ m/s^2$

$F = 764{,}4\ N$

Maka $\sigma = \frac{F}{A}$

$\sigma = \frac{764{,}4}{13{,}82}$

$\sigma = 55{,}31\ N/mm^2$

c. ReganganspesimenV2 (FF)

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{1}{169} \times 100$

$\varepsilon = 0{,}59\ \%$

d. Modulus elastisitasspesimenV2 (FF)

$E = \frac{\sigma}{\varepsilon}$

$E = \frac{55{,}31}{0{,}59\ \%}$

$E = 9292{,}23\ N/mm^2 = 9{,}29\ GPa$

3. Spesimen V3 (FF)

   a. Luaspenampangspecimen V3 (FF)

      Diketahui : Tebalspesimen (t) = 1,11 mm

      Lebarspesimen (l) = 12,76 mm

      Ditanyakan A (Luaspenampangspesimen) ?

      A = t x l

      = 1,11 x 12,76

      = 14,16 mm^2

   b. TeganganspesimenV3 (FF)

      $\sigma = \frac{F}{A}$

      F = $\frac{3,5}{100}$ x 2000 kg x 9,8 m/s^2

      F = 686 N

      Maka $\sigma = \frac{F}{A}$

      $\sigma = \frac{686}{14,16}$

      σ = 48,43 N/mm^2

   c. Reganganspecimen V3 (FF)

      $\varepsilon = \frac{\Delta L}{L}$

      $\varepsilon = \frac{1}{167}$x 100

      ε = 0,59 %

   d. Modulus elastisitasspesimenV3 (FF)

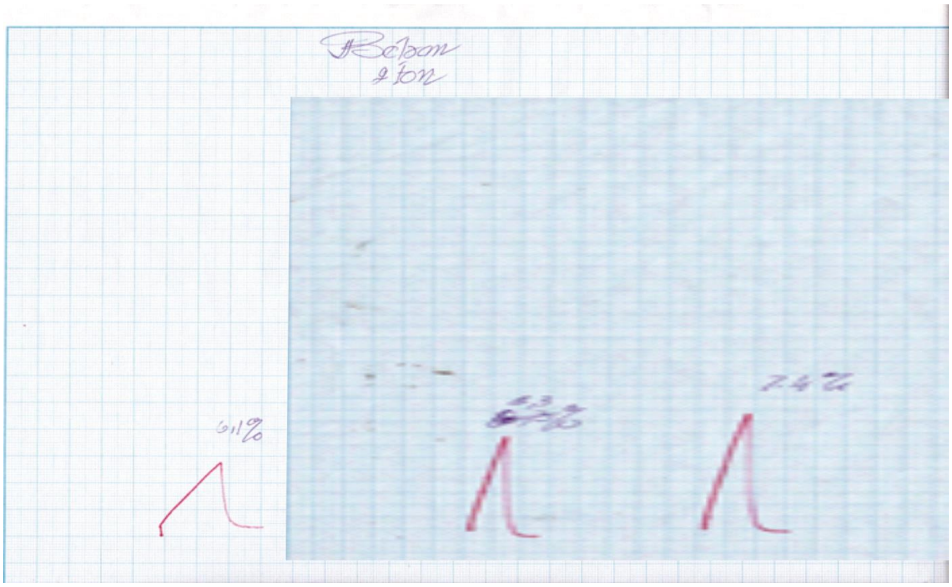
$$E = \frac{\sigma}{\varepsilon}$$

$$E = \frac{48{,}43}{0{,}59\ \%}$$

$E = 8088{,}48\ N/mm^2 = 8{,}08\ GPa$

Pengujian tarik perbandingan

Perhitungan pengujian tarik pada komposit*hybrid* serat rami dengan cara lapis satu serat rami anyam dan serat rami acak mengunakan metode *vacuum infusion.*



1. SpesimenV1 (RR)
    a. LuaspenampangspecimenV1 (RR)

        Diketahui : Tebalspesimen (t) = 1,21 mm

        Lebarspesimen (l) = 14,33 mm

        Ditanyakan A (Luaspenampangspesimen) ?

$$A = t \times l$$

$$= 1{,}21 \times 14{,}33$$

$$= 17{,}33 \text{ mm}^2$$

b. TeganganspesimenV1 (RR)

$\sigma = \frac{F}{A}$

$F = \frac{6{,}1}{100} \times 2000 \text{ kg} \times 9{,}8 \text{ m/s}^2$

$F = 1195{,}6 \text{ N}$

Maka $\sigma = \frac{F}{A}$

$\sigma = \frac{1195{,}6}{17{,}33}$

$\sigma = 68{,}95 \text{ N/mm}^2$

c. Reganganspecimen V1 (RR)

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{2}{166} \times 100$

$\varepsilon = 1{,}20\ \%$

d. Modulus elastisitasspesimenV1 (RR)

$E = \frac{\sigma}{\varepsilon}$

$E = \frac{68{,}95}{1{,}20\ \%}$

$E = 5723{,}11 \text{ N/mm}^2 = 5{,}72 \text{ GPa}$

2. SpesimenV2 (RR)

a. LuaspenampangspecimenV1 (RR)

Diketahui : Tebalspesimen (t) = 1,57 mm

Lebarspesimen (l) = 14,83 mm

Ditanyakan A (Luaspenampangspesimen) ?

A = t x l

= 1,57 x 14,83

= 23,28 mm^2

b. TeganganspesimenV2 (RR)

$\sigma = \frac{F}{A}$

F = $\frac{6,3}{100}$ x 2000 kg x 9,8 m/s^2

F = 1234,8 N

Maka $\sigma = \frac{F}{A}$

$\sigma = \frac{1234,8}{23,28}$

σ = 53,03 N/mm^2

c. ReganganspesimenV2 (RR)

$\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{1}{166}$x 100

ε = 0,60 %

d. Modulus elastisitasspesimenV2 (RR)

E = $\frac{\sigma}{\varepsilon}$

$E = \frac{53,03}{0,60\ \%}$

$E = 8803,67\ N/mm^2 = 8,80\ GPa$

3. SpesimenV3 (RR)

   a. Luaspenampangspecimen V3 (RR)

      Diketahui : Tebalspesimen (t) = 1,71 mm

      Lebarspesimen (l) = 14,62 mm

      Ditanyakan A (Luaspenampangspesimen) ?

      $A = t \times l$

      $= 1,71 \times 14,62$

      $= 25\ mm^2$

   b. Teganganspecimen V3(RR)

      $\sigma = \frac{F}{A}$

      $F = \frac{7,4}{100} \times 2000\ kg \times 9,8\ m/s^2$

      $F = 1450,4\ N$

      Maka $\sigma = \frac{F}{A}$

      $\sigma = \frac{1450,4}{25}$

      $\sigma = 58,01\ N/mm^2$

   c. Reganganspecimen V3 (RR)

      $\varepsilon = \frac{\Delta L}{L}$

$\varepsilon = \frac{1}{166}$x 100

ε = 0,60 %

d. Modulus elastisitasspecimen V3 (RR)

$E = \frac{\sigma}{\varepsilon}$

$E = \frac{58,01}{0,60\ \%}$

E = 9630,57 N/mm^2 = 9,63 GPa