STABILITY OF KNOT PRESERVED BY LATEX AND RUI
(Stabilitas Simpul yang Diawetkan dengan Latex dan Rui)

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ABSTRACT
This study tried to determine effect of rui and latex on stability of polyamide (PA) and polyethylene (PE) knot. Result shows that rui reduced 60% of stability of PA knot and 40% of PE knot, while latex reduced 43% of PA knot and 50% of PE knot.

Key words: Latex, rui, stability of net, polyethylene, and polyamide.

1. INTRODUCTION
1.1. Background
A kind of net that has been used to forming fishing gear at the beginning is made from natural fiber, vegetable fiber or even animal fiber. Examples of vegetable fiber are cotton, manila, sisal, hemp, linen and ramie. So animal fibers among others are silk and wool. From both kind of fiber, its vegetable fiber that mostly use, because cheaper and easily to get.

Net made from vegetable fiber is easy to rotten, so it's not imperishable to use. Effort that works to handle it is by preserved. Its purpose to hampered rottenning process, so tools use period will much longer. Besides that, also to colouring and adding breaking strength.

Net invention that made from sintetic fiber cause vegetable fiber is no longer use. Almost entire part of fishing gear – especially net pan – made from sintetic fiber. Although without preserved, this kinds of net has a lot of superiority compare with natural fiber net, like stronger, longer life, and flexible.

Preserved on net that made from sintetic fiber actually already unnecessarily needed. But in the reality this effort still many worked by fisherman. For example is Palahuhanratu fisherman that preserved payang fishing gear – stacked up on net that made from polyethylene (PE) fiber and polyamide (PA) net yarn -- with latex and rui.

Effect of preserved with latex and rui to PE and PA net yarn already works by Mahaputra (2004). Its result that preserved on PE yarn not causing any changes on it's breaking strength. This is different with PA breaking strength that becomes higher, especially if preserved with latex. Draining speed of PA yarn also bec more after preserved.

Yam and knot is a unity that forming net. Preserved impact will cause on breaking strength, but also to net’s knot stability. In previously research effect on knot has not done yet. Therefore, in this research will be observe effect on net's knot stability. It so net that been use is made from polyamide (PA) and polyethylene (PE) yarn. In this research does not discuss problems also stability between the two kinds of net.

Scientist publication that discussing problems of preserved impact on break of net yarn, a lot are found, like Shimozaki (1959), Sari (1959), Pusparwati (1985). It so happens book (literature) that content research ab after preserved is has not been found. Although like that, literatures above reference in discussing this research result.

1.2. Research Purpose
This research is purpose to determine how much the rui and latex preserved polyamide (PA) and polyethylene (PE) knot stability.

2. METHODOLOGY

Before its pull, net is soak inside preserved like latex and rui along 7, 14, 42, 49, 56, 63, and 70 days. Net mesh amount for every preserved period is preserved is 40 pieces. Preserved period that alternately 7 days is means is really able to enter inside cavity between yarn fibers and cavity in knot. After before the research is works firstly do pulling on PA and PE net re preserved. Pulling amount on every kinds of yarn is 40 times. It result is or and making as knot control stability value. Sequences in stability experimental research are:

1). PA net is soak inside rui preserved;
2). After 1 days soaking, 40 net mesh pick up and drain up;
3). Net mesh pull to the net length direction;
4). Data that list on breaking strength tester in cause of knot released is rect
5). Experiment continued for next preserved period; and
6). The same experiment also done for PA yarn with latex preserved and rui and latex preserved.
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ABSTRACT

tried to determine effect of rui and latexes solvent to stability of polyamide polyethylene (PE) knot. Result shows that rui reduced 60% stability of PA 50% at PE knot, while latexes reduced 43% stability of PA knot and 50% of PE knot. Latex, rui, stability at knot, polyethylene, and polyamide.

DUCTION

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yet that has been use to forming fishing gear at the beginning is made from kr vegetable fiber or even animal fiber. Examples of vegetable like are tula, sisal, hemp, linen and ramie. It so animal fibers among others are silk from both kind of fiber, its vegetable fiber that mostly use, because cheaper get.

weakness that made from vegetable fiber is easy to rotten, so it’s not s to use. Effort that works to handle it is by preserved. Its purpose to stopping process, so tools use period will much longer. Besides that, also to adding breaking strength.

in that made from sintetic fiber cause vegetable fiber is longer use. e part of fishing gear, especially net part - made from sintetic fiber. without preserved, this kinds of net has a lot of superiority compare with net, like stronger, long life, and flexible.

in that made from sintetic fiber actually already unnecessarily needed. reality this effect still many worked by fisherman. For example is a fisherman that preserved polyethylene fishing gear " stacked up on net that polyethylene (PE) fiber and polyamide (PA) net yarn - with latexes and rui. served with latexes and rui to PE and PA net yarn already works by 0031. Its result that preserved on PE yarn not causing any changes on it’s nght. This is different with PA breaking strength that becomes higher, especially if preserved with latexes. Drawing speed of PA yarn also becomes higher after preserved.

Yarn and knot is a unity that forming net. Preserved impact will cause on nor only yarn breaking strenght, but also to net’s knot stability. In previously research preserved effect on knot has not done yet. Therefore, in this research will be observed preserved effect on net’s knot stability. It so net that been use is made from polyamide (PA) and polyethylene (PE) yarn. In this research does nor discuss problems about different stability between the two kinds of net.

Scientist publication that discussing problems of preserved impact on breaking strength of net yarn, a lot are found, like Shimozaki (1959), Sari (1985), Prajudi (1983), and Syahailatua (1985). It so happens book (literature) that content research about stability after preserved is has not been found. Although like that, literatures above still use as reference in discussing this research result.

1.2. Research Purpose

This research is to determine how much the rui and latexes preserved effect to polyamide (PA) and polyethylene (PE) knot stability.

2. METHODOLOGY

Research is works in laboratorium by using experimental method. Material that tested is net that made from polyamide (PA) yarn No. 240 D/9 and polyethylene (PE) No. 380 D/9. Knot stability measure by using breaking strength tester. Picture 1 shows form and knot position when pulling.

Before its pull, net is soak inside preserved like latexes and rui along 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days. Net mesh amount for every preserved period and kinds of preserved is 40 pieces. Preserved period that alterrnally 7 days is means so preserved realable to enter inside cavity between yarn fibers and cavity in knot. As control, so before the research is works firstly do pulling on PA and PE net mesh that not preserved. Pulling amount on every kind of yarn at 40 times. It result is on an average and making as knot control stability value. Sequencer in stability experiment in this research are:

1). PA net is soak inside rui preserved;
2). After 1 days soaking, 40 net mesh pick up and drain up;
3). Net mesh pulls to the net length direction;
41). Data that list on breaking strength tester in cause of knot released is record;
5). Experiment continued for next preserved period; and
6). The same experiment also done for PA yarn with latexes preserved and PE yarn with rui and latexes preserved.

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3. RESULT AND DISCUSSION

3.1. Polyamide (PA) Knot Stability

a. Preserved result by using rui

Pulling on 40 net mesh PA control resulted release knot percentage of PA control by 85.75% (23 pieces). Next day, the preserved using rui, PA knot percentage which release is increasing average as big as 4.75% (Picture 2). As many as 359 knot, when pulling 60 net mesh, be divided around 34 knots release every pulling of 40 net.

So increasing of preserved period is decrease knot amount that release bigger.

In Picture 3 shows PA knot stability by using rui as long 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days. Snaking time added causing knot stability decrease. It's shown by its regression equation, which $F_{\text{re}} = 0.0103 t + 3.0005$. Slope value of these line equation is positive (+0.0103). Small slope value of regression equation causes that line very low and not vary clearly.

Of regression line equation on Picture 3 in guessing observation value of its determination value as big as 52.6%. It means, as many as 52.6% of beakings strength observation value is on regression line. The determination value small, so a lot of observation data can not be explained.

If notice on Picture 3, PA knot that preserved with rui in every period has lower stability value compare with results of PA control. Preserved value give negative influence to PA knot stability.

b. Preserved result by using latexs

Percentage of PA knot that release after preserving is fluctuate along with times, on an average its value reach 18.45%. It means knot stability is 81.55% knot mesh that is pull, it turned out only 3 knots that released. 

Amount every pulling of 40 mesh as many as 7 pieces. This value is for percentage of PA control that release as big as 75.75% (23 knots), as well as its increasing of the preserved time, but with its knot stability decreasing.

Preserved of PA net with latex is causing its knot stability increase. Picture 3. Its regression equation is $F_{\text{re}} = 0.0077 t + 3.8237$ with positive +. Slope value 0.0077 shows that every increase of the period increased on $F_{\text{re}}$ as big as 0.0077 knot. It's shows knot stability. Determination value as big as 55.6% of the regression line equation which is small shows that amount of observation data that can not be explained.  

Stability value of PA knot that preserved with latex in every preserved time gives stability value of PA control as big as 7.22 kgf. Therefore, this knot has increasing of stability along with added of preserved period, but still its under knot stability value of PA control. So, preserved with latex can increase knot stability decreasing.

Picture 3 shows PA knot stability by using latex as long 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days. With increasing of preserved period, PA knot stability decreased. It's shown by its regression equation, which $F_{\text{re}} = 0.0103 t + 3.0005$. Slope value of these line equation is positive (+0.0103). Small slope value of regression equation causes that line very low and not vary clearly.

Picture 2. Percentage of release PA knot after preserved rui (o) and latex (•)

that gets in the beginning will be analyzed statistically. But because statistical
analysis is not done, so those ways of countable is can not be done. As
present in form of graph and analyze in descriptive.

![Diagram of knot pulling](image)

Picture 1. Form and position of net mesh when pulling

**ND DISCUSSION**

**(PA) Knot Stability**

Result by using *rui*

Net mesh PA control resulting release knot percentage of PA control as 23 pieces. Next after its preserved using *rui*, PA knot percentage which using average as big as 84.75% (Picture 2). As many as 339 knots, filling 400 net mesh. Or, around 34 knots release every pulling of 40 net mesh of preserved period is causing lesser amount that release bigger.

We PA knot stability by using *rui* as long 7, 14, 21, 28, 35, 42, 49, 56. Soaking time added causing knot stability decrease. (As shown by its ion, which $F_2 = 0.0103 \pm 3.3000$). Slope value of those line equation (103). Small slope value of regression equation causes that line slope's very clear.

Regression line equation on Picture 3 in guessing observation value shown ion value as big as 52.6%. Its mean as many as 52.6% of breaking strength observation value is on regression line. That determination value can be said small, so a lot of observation data can not be explain.

If its notice on Picture 3, PA knot that preserved with *rui* in every period of preserved has lower stability value compare with *yam* stability of PA control. Preserved with *rui* is give negative influence to PA knot stability.

**b. Preserved result by using latex**

Percentage of PA knot that release after preserving is fluctuate along with time added, but if on an average its value reach 18.25%. It means knot stability is increase. From 400 knot net mesh that is pull, it turned out only 73 knots that released. Or, release knot amount every pulling of 40 meshes as many as 7 pieces. This value is lower from knot percentage of PA control that release as big as 57.5% (23 knots). Knot amount that release along with its increasing of increase the preserved time, but with less amount.

Preserved of PA net with latex is causing its knot stability increase, like shown in Picture 3. Its regression equation is $F_{PA} = 0.0077t + 3.8257$ with positive slope value (+). Slope value 0.0077 shows that every increase of soaking period as big as one unit will causing breaking strength of PA yarn that preserved with increasing as big as 0.0077 unit on first knot stability. Determination value as big as 45.01% on those equation which is small shows that of observation data that can not be explain.

Stability value of PA knot that preserved with latex in every preserved period is less than knot stability value of PA control as big as 7.22 kgf. Therefore, although happens increasing of stability along with added of preserved period, but still its stability value is under knot stability value of PA control. So, preserved with latex can cause on knot stability decreasing.

![Percentage of release PA knot after preserved with rui(o) and latex(●)](image)

Picture 2. Percentage of release PA knot after preserved with rui(o) and latex(●)

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3.2. Polyethylene (PE) Knot Stability

a. Preserved result by using rui

Pulling on 40 net mesh of PE control is resulting knot amount of PA control that release as many as 30 pieces (75%). Knot mentioned that release after preserved with rui increasing as big as 81.25%, or averagely 33 knots for each treatment period. Although added of knot amount that release is little if compare with control knot, but preserved with rui cause knot stability of PE net getting less.

Preserved of PE knot with rui not really causing any increasing of stability value starts from preserved period 7 until 70 days. From Picture 5 shows those regression equation ($F_{lw} = 0.0019 + 7.4647t$) with slope value 0.0019 that relatively flat. Those equation determination value as big as 0.1745 explain that too many data that can not be explain by that equation.

Soaking of PE knot in rui preserved fluid, straightly decrease its stability. Stability value of PE knot that preserved -- gtrhy from preserved period 7 ~ 70 days -- lower than its control knot stability. Therefore rui preserved is give negative influence on PE knot stability.

b. Preserved result by using latex

Preserved of net mesh with latexes cause knot amount that release as many as 27.25% from total 400 mesh that test by pulling (Picture 6). Or as many as 114 knot for every soaking period with sample amount as many as 40 knots. This amount is more less from experiment result of pulling the sample net mesh that resulting release knot amount as many as 75% or 30 knots from 40 net meshes that experimented. Preserved with latex is causing knot amount that really decreasing.
The 3. Relation between preserved period $t$ with PA knot stability that preserved with $F_{pr}$ and latex $F_{la}$.

**Kynlene (PE) Knot Stability**

result by using $F_{pr}$

At net mesh of PE control is resulting knot amount of PA control that release
30 pieces (75%), Knot amount that release after preserved with rui 8 big as 81.25%, or averagely 33 knots for each treatment period. Although to amount that release is little if compare with control knot, but preserved or knot stability of PE not getting less.

PE knot with rui not really causing any increasing of stability value started period 7 knot 70 days. From Picture 5 shows those regression equation (9.1: $F_{pr} = 7.6647 t + 0.0096 t^2$, $R^2 = 0.7955$) that relatively flat. Though equation $F_{pr}$ shows that too many data that can not be explain on.

Knot in rui preserved fluid, straightly decrease its stability. Stability knot that preserved started from preserved period 7 - 70 days lower than after PE knot. Therefore rui preserved is give negative influence on PE knot.

cut by using latex

If mesh with latexes cause knot amount that release as many as 27.23% mesh that test by pulling (Picture 4). Or as many as $11$ knots for every with sample amount as many as $40$ $mm$ mesh. This amount is more from it of pulling the sample net mesh that resulting release knot amount as or 30 knots from 40 net meshes that experimented. Preserved with latex amount that release decreasing.

In Picture 5 shows relation between preserved periods inside latex fluid with PE knot stability. $F_{pr}$ knot stability starts from the $7-70$ days inclined increasing, like shown by its regression equation $F_{pr} = 0.0096 t + 6.5855$. Low slope value 0.0096 shows stability increasing along with added of preserved period very low.

Latex preserved give negative impact to knot stability. It's shown by PE knot stability value at every preserved period also under knot stability of PE control.

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3.3. Preserved Effect

Preserved of PA and PE knot, with rui or lateks preserved, and is causing its stability value decrease. Both cause knot become easier to release when pulling experiment. On PA yarn, rui effect is more worse compare with latex. It so for PE knot, latex preserved give negative effect compare with rui.

PA net yarn have special characteristic, which small water absorb strength (Sari, 1995). When PA knot that preserved with latex pick up and drain up, so its colour change to black. This is cause by carbon compound that subsitute inside latex. It so happens red with brownies colour on PA knot that preserved with rui is causing by red with brownies colour pigment on rui. According to Lemmens & Wulijarni (1999), red with brownies colour comes from salam plants pigment. PA net yarn that preserved with latex and rui also experience changes on diameter and rigidity, which yarn become stiffer and its diameter also increase. This increase is causing by adhesion power between PA net yarn with those two preserved that bigger than in cohesion power. This pull-drawn power is cause rui and latexes able to patch on net yarn.

PA yarn fibre is very soft and its space between fibers is very tight. Characteristic of rui which is more liquid from latex causes its easy to enter inside space between fibers. The result PA knot is expand and slippery. This is different with latex. This fluid is thicker and easy draining when knot is picking up from preserved fluid. Form of latex that covered knot will be little holds movement between yarns on knot when pulling experiment.

Effect of those two preserved on PE knot is different with PA knot. Construction of PE yarn is different with PA yarn. PE yarn is slippery, stiff, and its fiber is hard. According to Arzano (1959), PE does not absorb water. Besides that, there are cavities between fibers that relative big. In knot shape, this cavity amount is much more. When preserving, latex preserved fluid will enter inside those cavities. When latex draining, knot become harder to release.

4. CONCLUSION

Rui preserved decreasing PA knot stability value as big as 60 % and PE 46 %, meanwhile latex decreasing PA knot stability value as big as 43 % and PE 50 %.

5. REFERENCES


rved Effect

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Both cause knot strength become easier to release when pulling experiment. On it effect is more worse compare with latex. is so for PE knot, latex preserved active effect compare with rui.

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It is very soft and its space between fibers is very tight. Characteristic of rui 5% liquid from latex causes its easy to enter inside space between fibers. The knot expand and slippery. This is different with latex. This fluid is thicker string when knot is picking up from preserved fluid. Form of latex that will be little holes movements between yarns on knot when pulling

1 two preserved on PE knot is different with PA knot. Construction of PE 5 with PA yarn. PE yarn is slippery, stiff, and its fiber is hard. According 59%, PE does not absorb water. Besides that, there are cavities between active big, in knot shape, this cavity amount is much more. When 5X preserved fluid will enter inside those cavities. When latex draining, wider to release.

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decreasing PA knot stability value as big as 60 g, and PE 46 g, decreasing PA knot stability value as big as 43 g, and PE 50 g.

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