

# INTERNATIONAL CONFERENCE ON SUSTAINABLE DEVELOPMENT (ICSD)

*Theme:*

*Engaging Science, Technology and Culture  
to Accelerate the Achievement of A Sustainable Development*



MAHASARSWATI DENPASAR  
UNIVERSITY



BANSOMDEJCHOPRAYA  
RAJABHAT UNIVERSITY



UNIVERSITY OF  
FLORIDA

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## OPENING REMARKS



### Kopertis Wilayah VIII Bali Nusra

Om Suastiastu, Good Morning, Good prosperity for all of us.

Om Suastiastu , Good morning , Good prosperity for all of us. It is a great honor for being with us , the Rector and Vice Rectors of Mahasaraswati Denpasar university, Perguruan Rakyat Saraswati foundation, the committees, the participants, invitations and all ladies and gentlemen.

In the beginning of this speech, let us praise Ida Hyang Widhi Wasa and rise up our thanks to Him for showering us with His Blessing so that we all can gather here to attend "The International Conference On Sustainable Development"

On behalf of the Coordinator of Private University Region VIII, I would like to congratulate to Mahasaraswati Denpasar university for the sixth Lustrum celebration and I hope that Mahasaraswati Denpasar University increased and become qualified university. Ladies and Gentlemen, globalization is an inevitability of time inevitably encountered by any country in the world. The Era of globalization requires the people to be always ahead in every age, making development for the sake of development is sometimes far from an order. It requires us to continue to grow. Therefore, Education for Sustainable Development (EfSD) become increasingly meaningful role in the world of education.

EfSD is born coinciding with the condition the contemporary world facing increasingly complex issues and leads to chaos. It looks ever increasing world population growth exceeds the capacity of the Earth's natural productivity. The development of rapid communications and transportation, the birth rate which is a huge problem in globalization, trade, environment, poverty. Through EfSD, it is expected to wake up the community or nation which was able to build, develop, implement action plans that lead to sustainable development.

The concept of sustainable development is a pattern of utilization of resources to meet human needs while maintaining the environment, so that not only meet the needs of today but also for future generations. Sustainable development as development that meets

the needs of the present without compromising the ability of future generations to meet their own needs. EfSD is education in support of sustainable development, namely education which gives awareness and ability to everyone especially future generations to contribute better for sustainable development in the present and future.

EfSD emphasizes on three pillars: economic, environmental, and ecological or social. These aspects are mutually. For example, the health and welfare of society depends on a clean environment as a place to meet their needs such as getting food and resources, clean water, and clean air. Sustainable means thinking about the future, where the environment, society and economy into consideration so that it obtained a balance in development and efforts to improve the quality of life.

The function of EfSD as follows : first, the community nation woke up to a capacity that is able to build, develop, and implement a plan of activities that lead to sustainable development, i.e. activities that support economic growth in a sustainable way by considering the ecosystem. Second, to educate in order to be aware of individual responsibility that should be contributed, to respect the rights of others, and natural diversity, can determine the choices/decisions are responsible, and be able to articulate it all in real action. Third, the growing commitment to contribute to the realization of a better life, a world that is more secure and comfortable, either now or in the future. We need to differentiate between education about sustainable development and education for sustainable development. The first had the meaning of learning for the mindfulness or theoretical discussion. While the second , used as an effort, education as a tool or a way to reach sustainability . Of course that is not just theoretical discussion. The community is on target to reach EfSD, elements of society ranging from kids to adults, adolescents, the elderly, men, women, groups and classes of any community is the place to be implanted seeding. EfSD in local communities must be due to the impact of sustainable development and sustainable development is not perceived directly at the local level. Thank you.

Om Santi, Santi, Santi Om

**Koordinator Kopertis Wilayah VIII Bali Nusra**

**Prof. Dr. Ir. I Nyoman Sucipta, MP**



## CONGRATULATORY REMARKS

Dear Distinguished Participants, Ladies and Gentleman

I am extremely delighted to be here with you this morning, and have a great privilege and honor to deliver congratulatory remarks at the opening ceremony of International Conference on Sustainable Development (or shortly we call ICSD). This event is result of fine collaboration among Mahasaraswati Denpasar University, Ministry of Education and Culture of the Republic of Indonesia, University of Florida, USA and BanSomdejchaophraya Rajabhat University, Thailand.

I would like, first of all, to extend my warmest welcome to all the participants to this conference who came to Sanur Bali not only from various region of Indonesia, but also from USA and Thailand. My sincere thanks also to all those involved in the preparation for this conference for their outstanding efforts and ingenuity they have put into this important event.

The ICSD conference is promote the theme of "Engaging Science, Technology and Culture to Accelerate the Achievement of Sustainable Development". This is realized by providing an inter-disciplinary forum on sustainable development for practitioners and academics at the international as well as domestic levels. This conference will serve as a vehicle to foster dialogue among various stakeholders for exchanging and sharing all of their experiences and research results, about all aspects of sustainable human and social development, and discuss the practical challenges encountered and the solutions adopted.

Furthermore, we welcome critical contributions from experts and stakeholders in all areas sectors, who are working in the area of sustainable development. From this it will emerge a more integrated, reflective, balanced, and applicable series of approaches for international, regional and local development.

I would like to take this opportunity to reiterate Mahasaraswati Denpasar University strong commitment to vigorously contribute to the sustained development and to its achieving the Millennium Development Goals by 2015. This conference is special ways for us for engaging our vision "to be the flagship university of higher education based cultural tourism" Sustainable cultural tourism need to borderless science, technology and culture for achieving sustainable living. We sincerely hope the ICSD will be able to take the first step toward integrating natural science and social science as well as modern (western) science and local (ethno) science.

Distinguished Participants, Ladies and Gentleman

Those are all the major things that I have deliver on this opportunity. Finally, on behalf of Mahasaraswati Denpasar University and partners, I officially saying thank you very much, for Prof Dr I Wayan Sucipta, MS (Coordinator of Indonesia Privete College Region VIII) who has been given opening remark;

Christopher Silver, PhD, FAICP (Dean and Professor College of Design, Construction and Planning University of Florida, USA), Prof Dr Emil Salim (Former Minister of the Environment of the Republic of Indonesia), Professor Dr. Supol Wuthisen (The President of BanSomdejchaophraya Rajabhat University, Bangkok) , Dr Kevin Thompson (Associate Professor and researcher from University of Florida, USA) as speakers on plenary session; more than 70 speakers both for oral and poster presentation, and other participants on this event.

**Rector of Mahasaraswati Denpasar University**

**Tjok Istri Sri Ramaswati, SH., MM**



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## UTILIZATION OF NEW NATURAL FIBER AS COMPOSITE MATERIALS BASED ON ARCHITECTURE PRODUCTS DESIGN

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### Abstract

Utilization of natural fibers as strengthened in composite materials as new products have a great chance to replace metal, wood and ceramic products. Interior panel products for example, nowadays is not only focused on their qualities but also on the art and aesthetics appearance should be considered as innovative products. It is based on the market demand in which artistic value is needed. Natural fiber *spinosa thund* is a new fiber that offers the value of art with its natural properties will provide comfort for anyone who uses this natural product. The existence of market competition and the increasing needs of society both to load and use in terms of art / aesthetics that is necessary to improve the quality of these raw materials (increased lifespan) so as to enhance industrial productivity, may improve the welfare of Indonesian industrial society in addition to employment Indonesian farmers for fiber processing. Natural fibers utilization research has been done since several years ago but only a few natural fibers that can be produced such as kenaf and hemp fibers that can be applied safely for automotive products. Natural fibers utilization research on *spinosa thund* has been conducted by researchers since the last two years and is currently developed applications on products and wall panels art tiles. Generally, the wall tiles is made by materials such as porcelain, clay or ceramic glaze. In this case the researchers made the product wall tiles with composite materials in the design process variable polyester fiber orientation *spinosa thud*. Polyester resin was used polyester BQTN 108-EX. In this case the *Licuala spinosa thund* fiber is a natural fiber derived from plants belonging to the *Licuala spinosa thund* Arccaccae or Palmae family. Preparation of specimen test forms depend on standard products which is available in the market. Performance of these products will be investigated based on their load (impact and flexure strength) versus fibers orientation design. From the analysis of tests on model design fiber orientation, straight and oblique showed that the highest impact strength against shock loads obtained in the two direction layer (0 and 90 degree) fiber orientation (0.0033 Joule/mm<sup>2</sup>) this is the case for bending strength best designs obtained is not same orientation (6, 44 Mpa on 45 degree fibers orientation). This orientation is the most artistic and easieast to control their design. The quality of composite fibers depend on their fabrication process (fibers treatment and manual hand lay up methods).

**Keywords:** wall tiles (wall tiles), Polyester resin BQTN 108-EX, *Licuala spinosa thund* fiber.



## INTRODUCTION

Composite materials design based on natural fibers are increasingly regarded as alternative to metal, wood and ceramic materials. Based on ecological consideration, composites natural fibers are more friendly. Agricultural or biodegradable material plays important role in human life. The advantage of using such resource is that, they are widely distributed all over the world, its multifunctional, strength and biodegradable [3]. The other hand, parts with a reinforcement of natural fibers are safer than glass fibers parts, as no sharp edged fracture surfaces occur in case of crash. It is about 4000 to 5000 tons of natural fibers were used in European automotive industry in 1996 [Dieter H et al, 2004]. Currently, an average of 5 to 10 kg of natural fibers is incorporated in every European passenger car with interiors parts such as door trim panels or trunk liner as the main fields of application [2]. Nowadays, composites natural fibers research is issued on impact strength applications such as good shoot behaviour as anti-ballistic products (armour materials). Fiber reinforced composites with thermoplastic matrices have successfully proven their high qualities in various fields of technical application. Apart from conventional fiber materials like aramide, kevlar or glass fibers natural fibers such as hemp or flax are increasingly applied for reinforcement.

Further advantages of a reinforcement by natural fibers result from their high absorptivity, which creates excellent acoustics and an air cleaning effect. With respect to industrial safety, natural fibers do not cause allergic reactions or skin irritations. And finally a positive image and product Marketing related to the utilization of a renewable material should be taken into consideration.

There are several geometries/architectures for natural fibers composite. The various types of architectures can be formed depending on how the pattern in the interlaced regions is repeated. In this paper, new natural fibers (*Licuala spinosa* thund fiber) was utilized as reinforcement is studied. This natural fibers shown the ability to be produced in a continuous form.

The mechanical properties of the fibers orientation have been studied especially for static and impact loading of the parts. The paper describes the effects of orientations design parameters (continuous-0 degree, continuous-45 degree and combination 0 and 90 degree) on *Licuala spinosa* thund fibers for architecture components as well as the impact and flexure strength characteristics.

However, in order to utilize the mechanical capabilities of natural reinforced thermoplastics in a more Optimized way, a well-adapted process technology is required.





Flexure test (ASTM D790) and Impact test (ASTM D5942) as shown in Figure 3 and Figure 4.



Figure 3. Bending specimen attachment [6]

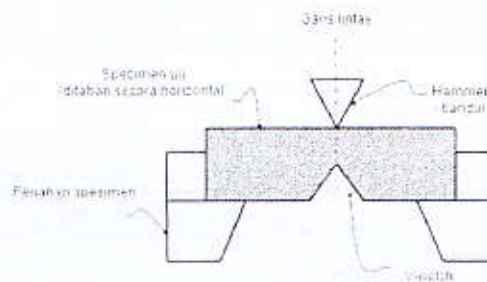


Figure 4. Impact specimen attachment [7]

Figure 3 shows a bending specimen in which at the end of edges are free or simply supported. The specimen were loaded by central transverse impacts. The difference with Figure 4 is about the type of load in which this load is impacted. The characteristics of liquala spinosa thund reinforment natural camposite are attainanble the data of bending strength and impact strength.

## RESULT AND DISCUSSION

### Influence of the orientations parameters on the flexure behavior

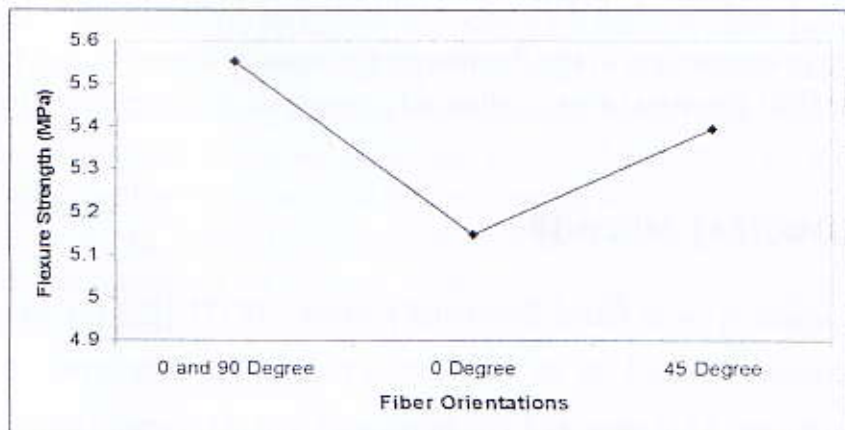


Figure 5. Bending strength vs fibers orientasions



Figure 5 shows the influence of the the bending strength of the different fibers orientations polyester composites materials reinforced by liquala spinosa thund natural fibers. The orientation of fibers are 0 degree, 45 degree and combination 0 and 90 degree in which this layer is placed in the middle of polyester matrix. The highest number is showed on combination 0 and 90 degree orientation layer followed by 45 degree of fibers orientation and the lowest is 0 degree orietations fibers. These results shows that fibers orientation is very important depend on the specific static loading. The fibers orientation (0 and 90 degree) as reinforcement is a major parameter to reduce the material stress fram two direction. The propagation of cracks between fibers and matrix is not easier to happen if the specimen were loaded by central transverse flexure loading or one direction.

The pattern of natural fibers composites should be contains fibers oriented on at least two axes, in order to provide great strength and stiffness [4]. Zouari B(2007) carried out yarn process by varying parameter for the simulation in fact to apply the mechanical law behavior in tension along their direction.

#### Influence of the orientations parameters on the impact behavior

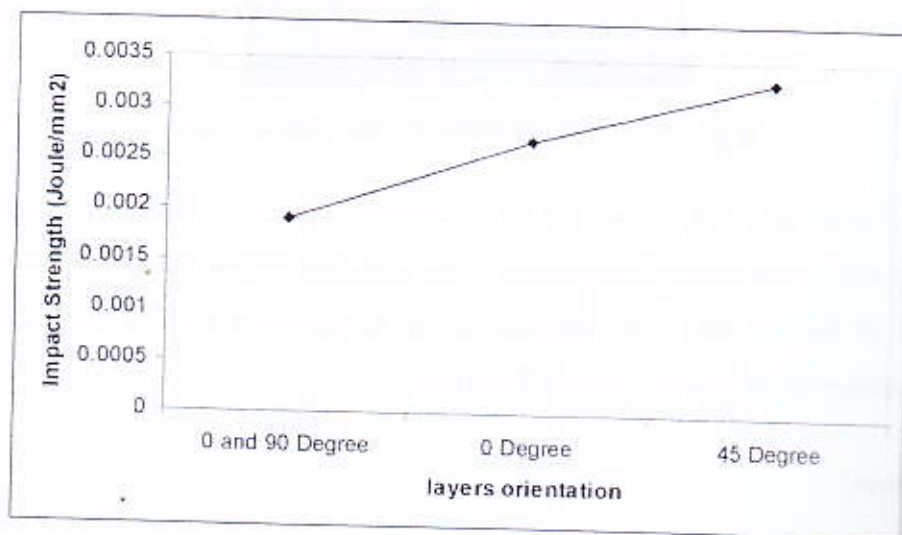


Figure 6. Impact strength vs fibers orientation

From the impact tests it is also apparent that if the orientation layers to combine 0 degree with 90 degree, the impact value is increased, Fig 6. These effect is not related to bending test given in Fig 5. Figure 6 provides further evidence of how the impact resistance is increase if the orientation layers performed in the one directions i.e. 45 degree. This is because 45 degree of fibers orientation can cause slip between fiber and matrix that makes is not easier to release interfacial bonding.

This mechanical performance is depend on the fabrication process in which composite natural fibers is very difficult to reach uniform by hand lay up fabricated. But one thing is certain that orientation of fibers will be effected by the orientation of load. And, the results give the indication of the effect of the fiber surface treatment.

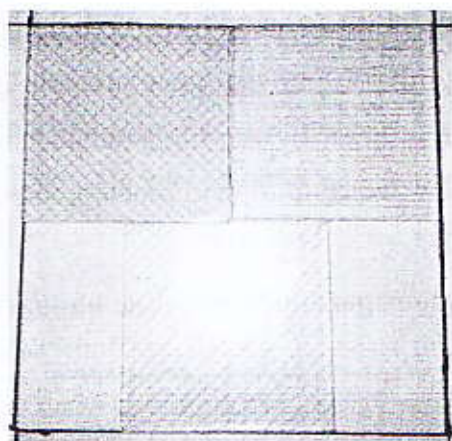


Figure 7. Fiber orientation wall tile product

In addition, Fig 7, the use of orientation layers on wall tile production offers an economic strength approach to the industry. These invitation will occur to those in the art and good appearance on aesthetically and be matched with typical colour of transparent natural furniture.

## References

- Dieter H. Mueller, Andreas Krobjilowski, Improving the Impact Strength Of Natural Fiber Reinforced Composites By Specifically Designed Material and Process Parameters, INJ Winter 2004 Fachbereich 04, Bremen, Germany



- Bledzki, A. K., Gassan, J., Composites reinforced with cellulose based fibres, *Progress in Polymer Science*, 24, (1999), pages 221-274
- R.M. Rowell, J.S. Hans and J.S. Rowell, Characterization and factor affecting fiber properties. *Natural polymers and Agro-fiber composites* (2000).
- Rajiv. A. Naik // *Journal of Composite Materials* **29** (1995) 2334.
- Ph. Boisse, B. Zouari and J.L. Daniel // *Composite Part A* **37** (2007) 2201.
- Annual book of ASTM standards. ASTM. 2002. Philadelphia : D790
- Annual book of ASTM standards. ASTM. 2002. Philadelphia : D5942

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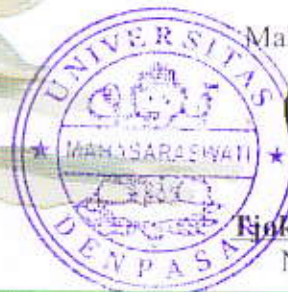
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Oral Presentation

In an International Conference with the theme “Engaging Science, Technology and Culture to Accelerate the Achievement of A Sustainable Development” held on 6<sup>th</sup> March 2012 at Grand Inna Bali Beach Sanur Denpasar - Bali

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