

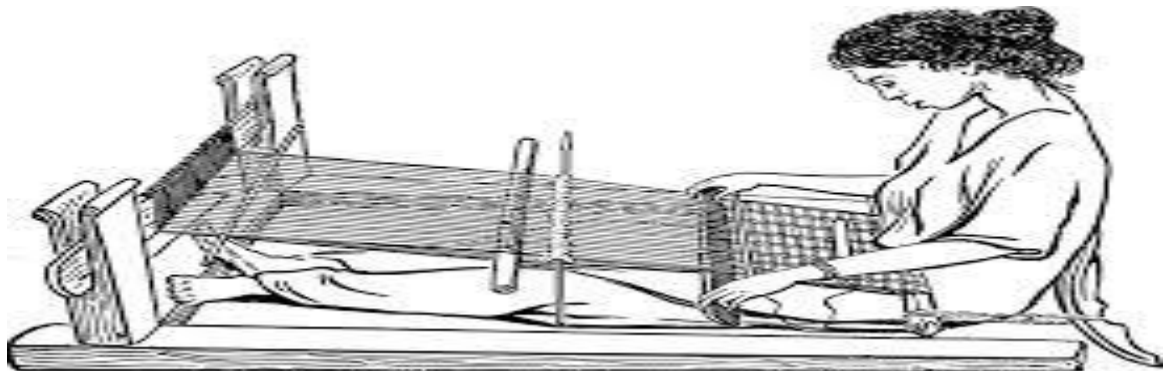
TEXTILE AND FABRIC MANUFACTURING



TENUN DUDUK

- **MEANING:**

The word “**TENUN DUDUK**” is Indonesian word which means “**SEATED WEAVING**”



This is technique to weave the fiber(**YARN**) by using the amazing instrument shown in figure. The information about this technique and instrument is given below:

- **HISTORY OF TENUN DUDUK:**

In early 20th century, ATBM (**Alat Tenun Bukan Mesin**) or called non-mechanism loom was introduced to Indonesia.

It can be used to make a wider piece of cloth. There is one weaving technique called double ikat, where the warp and weft threads are dyed.

There is only one place in Indonesia, or indeed Southeast Asia, who makes double ikat. It is made in Bali by the Bali Aga people. This double ikat is called Geringsing, woven only in the remote village of Tenganan in East Bali. The oldest form of ikat is warp ikat, whereby the pattern is tied and dyed into the warp threads. It is commonly used by many people in Indonesia, including the Batak in Sumatra, the Dayak in Borneo, the Toraja in Sulawesi, and many cultures in West and East Nusa Tenggara. Ulos or uis which people commonly referred as a traditional Batak textile has a meaning as a blanket.

Nowadays, most of the Ulos have a good will words woven on the surface such as selamat pakai (**happy wearing**). Almost every house in Baduy-Java has a back-strap loom called a pakara and the girls are taught to weave from a very young age. One of the traditional cloth in Central Java is its striped cotton called Lurik which derived from the term Lorek, meaning striped. In Lio area, Flores-East Nusa Tenggara, there is a type of cloth called sarong lawo nepa mite, worn by pregnant women, where majority the motifs are snakes. The snake reflects ancient ideas and appears in their mythology and when a snake is spotted it is believed to bring good news. The weavers of Tanimbar-Maluku produced cloth for trade with Makassar and Banda, and then, in the **17th century**, they traded their clothes for a cotton thread with the Dutch. In the past when silk was sometimes harder to obtain, the weavers in South Sulawesi would starch the cotton cloth and polish it with a seashell to create a silk-like sheen. In Sintang-West Kalimantan, the general practice of weaving had all but disappeared until the 1980s when the local priest, Peter Maessen, encouraged those women who still knew how to weave to start making their textile again and make them to high standards.

- **DESCRIPTION:**

“Weaving is very distinctive, because the motifs and patterns are different in each region. So, it has become an inheritance, that every region has weaving that is impossible to replicate everywhere. Let alone overseas, people from neighboring or province next to it cannot imitate,” Triawan said to Kina. According to Triawan, there are various ways that can be done to appreciate weaving, including wearing weaving as everyday clothes. “Indeed, there are weaving material that is thick, and also there are some that only used as an accent. But if it can be used as a daily dress, it’s good,” said Triawan. Another thing that can also be done is to buy weaving at a price that is suitable to appreciate the craftsmen, who with a high level of accuracy and patience, they are able to produce stunning work on a piece of woven fabric. “We have to buy at a good price, which is still lacking. It’s kind of poor that they work for days, even months, but sometimes the price gap from the brokers are very large,” said Triawan. It is natural and obligatory for Indonesian people to look at their traditional products. As batik is now used among children to the elderly, woven is also expected to get space in the hearts of the lovers of homeland crafts. In addition to the domestic market, woven clothes also has the potential to penetrate foreign markets. However, Triawan said that a strategy is needed to market weaving to foreign countries. “If the foreigners may rarely use woven clothes, we can work on this. For example, use weaving accents on some of the exported handicrafts. As they mostly appreciate handicrafts.” Triawan said. For that, he continued, craft makers in Indonesia should embed weaving on every product that is created, especially products that will be exported to various countries. So that the world can begin to recognize weaving through these crafts. “The form can be various, for example the origin of plates, glasses, lamp covers or various kinds of displays that are a daily necessity,” Triawan said. To support the existence of woven clothes, Bekraf forms Creative Village Ecosystems in several potential areas in Indonesia, where weaving is one of the handicrafts chosen to be developed. According to Bekraf’s official statement, this program is intended to recognize the superior potential of the village by trying to find out from the 5 Chains of Creative Economy

Value, as well as 4 actors (Academics, Business, Community, Government, and Media), and 2 (two) leverage, which are future linkages and backward linkages. This program is carried out jointly and mutually synergized by cross-stakeholders that involves both central and local governments, creative communities as representatives of the community, academics and business people. The Creative Village Ecosystem has penetrated several areas with weaving as the main development sector, which are Sikka ikat weaving, East Nusa Tenggara, and Sikka ikat weaving, Maumere. Triawan hopes that with the popularity of unique weaving in various regions in Indonesia, the weaving artisans can also improve their welfare. So that aside from being a fighter to preserve the homeland culture, they can also achieve prosperity to provide for their families.

- **INSTRUMENT USED FOR TENUN DUDUK:**



- **MODERN INSTRUMENTS:**



- **METHOD OF MANUFACTURING:**



:- The young woman looked shrewd as her left hand was holding a small piece of wood about 1 meter long that was used to lift a string of threads that were lined up neatly before her. One hand was ready to hold one end of a thin piece of black wood. Instantly the wood is inserted into a cavity formed from a series of threads of red and white are being raised.

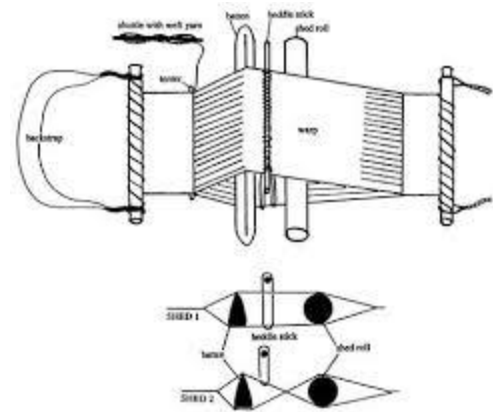
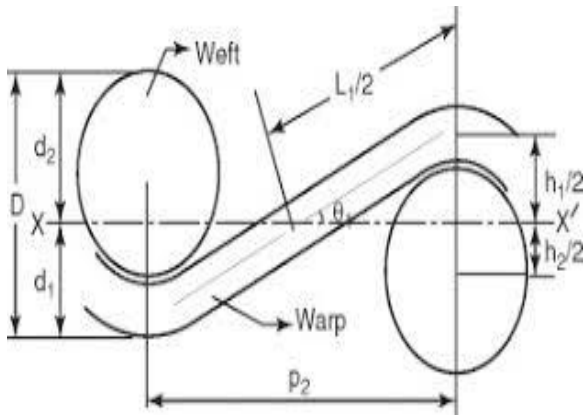
When the circuit is released again, the black wood that is left remains in the cavity and then rotated to a vertical position, so that it returns to

form a new cavity. He then inserted a red thread wrapped around a smaller piece of wood into the cavity. His hands clasped each other's black wooden tips, then pulled several times simultaneously toward his stomach. He looked relaxed, although there was a loud sound when the wood he was pulling hit a pile of threads that were getting denser and slowly seemed to begin to form a cloth. "I am weaving ikat for sling cloth," Ratna Almince Ton said when asked about her activities that afternoon when she was visited at her residence, in Bioni Gang, RT16 / RW8, Sonaren Sub-District, Kupang Regency. Beside the teenage girl who is familiarly called Ratna, another girl named Sindi Marani, 11 years old, sat on a small chair as high as one inch without leaning back. He appeared to be twisting the yarn around his knees which had been deliberately widened in a bent condition.

Occasionally Sindi looked at Ratna who was sitting on a cement floor with her legs stretched out in front, just below the string of threads that were being woven. "I started learning to weave since grade 2 of elementary school, initially learning to roll yarn like that," Ratna said, slightly turning her head towards Sindi to explain the meaning of her words. The 14-year-old teenage girl said that the weaving of ikat was started to be learned while still in elementary education. Since she was in elementary school, Ratna began to learn to weave from rolling yarn to operating a loom to make ikat cloth when she was in grade 5. Every stage of weaving is now mastered, starting from rolling yarn, cooking yarn, dipping dyes, tying yarn for motifs to operating equipment to produce ikat cloth. Ratna claimed that there were no significant difficulties in learning to weave. "Our family is indeed a weaver from my grandmother to my mother, so after returning from school, I learn to weave for several hours every day," said the first child of four siblings.

At the beginning of weaving, not many works of woven cloth were produced because they still use simple weaving tools which are a family inheritance. Ratna admitted, the weaving works produced began to increase when she began to join in a weaver group formed through the Astra Berseri Village Program (KBA) which channeled more complete

looms made from modern materials. He said "Now dozens of ikats have been produced, there are sashes, scarves, men's and women's sarongs, whose motives vary with this assistance,".



- **WHAT IS YARN?**

Yarn is a long, continuous length of fibers that have been spun or felted together. Yarn is used to make cloth by knitting, crocheting or weaving. Yarn is sold in the shape called a skein to prevent the yarn from becoming tangled or knotted. Yarn can be made from any number of natural or synthetic fibers such as wool, cotton, silk, or acrylic. Some yarns are made from a blend of several kinds of fibers. Yarns come in many thicknesses or weights from fine to thick: lace, fingering, sock, sport, double-knit (or DK), worsted, aran, bulky, and super-bulky. Very fine yarn is called thread and is used in sewing and embroidery.





- **WOVEN CLOTH CONTRIBUTION:**

Weaving itself is a technique in making fabric by combining the yarn lengthwise and transversely. Weaving, which is the part of the vertical thread, is called a warp thread, while weaving that is part of the horizontal yarn is tied up is called a weft. However, not all weaving motifs are made with the tie technique, such as songket which is woven by hand using gold and silver thread. Woven fabrics are usually made of wood fiber, cotton, silk, and others. The Indonesian woven industry continues to grow and has played an important role as a driver of the regional economy, thereby encouraging national welfare distribution on a national scale. Woven fabric is able to become one of the country's foreign exchange earners. It is seen from the value of its exports in 2016 which reached USD 2.6 million with its main destination is the Netherlands. In 2017, the Ministry of Industry has facilitated various things through the procurement of weaving equipment in the form of two Jacquard Non-Machine Weaving Units, one weaving motif card punching unit, and one unit of electric kelos machine to the Tanah Datar District Government, placed at the IKM Tenun Center Lintau Buo, Nagari Village Tanjung Bonai, Lintau Buo Utara District, Tanah Datar Regency, West Sumatra. In addition to facilitating the procurement of production equipment, the Ministry of Industry also provides assistance by weaving experts to further improve the competence of the craftsmen and the quality of the woven fabric produced. Typical Indonesian woven products have the potential to be the number one in the world, said the Director General of the Small and Medium Industries (SMI) of the Ministry of Industry, Gati

Wibawaningsih. "Indonesian woven fabric is number one in the world, we are only inferior to India, because they are close to raw materials," said Gati. It is because India has coarse cotton plants, which are used as raw materials for its weaving products. However, Gati believes that Indonesia's weaving creativity is the best in the world. For this reason, Gati seeks to secure the raw material for weaving. One of which is by implementing a Memorandum of Understanding on the Development of Weaving SMI Program through the Provision of Cotton Fiber Raw Materials in the District of South Central Timor, East Nusa Tenggara. In this case, the Ministry of Agriculture is responsible for planting cotton trees to be used as raw material by weavers in South Central Timor Regency, East Nusa Tenggara. "If the plants are harvested, then it can be used for weaving. Probably in next year," said Gati. At present, most of the weaving raw materials are still imported from the United States and China. While some weavers also planted cotton trees in the area they weave.

- **INDUSTRY LEVEL:**

Weaving is one of Indonesia's distinctive arts that has lived and developed for centuries, and has philosophical values that are part of Indonesian culture. Ikat or ikat cloth is an Indonesian woven work in the form of cloth woven from weft strands or warp yarns that were previously tied and dipped in natural dyes. The loom used is a loom not a machine. Kediri is one of the areas that also has the potential of ikat products with its products. The weaving industry in Kediri is one of the economic supports of a small portion of the community. Because the industry has absorbed labor, minimize unemployment and also play a role as preserving Indonesian culture. To find out the dynamics of the ikat industry in Kediri, the problem formulation is drawn (1) How is the development of weaving in Kediri? (2) What is the dynamics of the weaving industry in Kediri ?. The development of ikat in Kediri has begun to climb up. The beginning of the emergence of ikat cloth until now has changed a lot. The dynamics of the ikat industry that has experienced ups and downs has begun to stabilize. Craftsmen with traditional machines,

namely nonmachine looms (**ATBM**) can create naturalism motifs related to nature.

THERE IS ONE DISADVENTAGE OF KENUN DUDUK THAT IS MUSCULOSKELETAL DISEASE.

- **MUSCULOSKELETAL SYMPTOMS:**

KENUN DUDUK is a high risk occupation for developing musculoskeletal disorders (MSDs). The objectives of the present study, which was carried out in the Iranian hand-woven carpet industry ,were determination of the prevalence of MSD symptoms, identification of major factors associated with MSD symptoms and development of guidelines for work station design. 1,439 randomly selected weaver participated in this study. A questionnaire was used to collect data on MSD symptoms. The results revealed that the prevalence rates for symptoms in different body regions were high as compared to the general Iranian population (for neck, back and large joints, $p < .0001$). The results of multivariate analyses showed that major ergonomic factors associated with musculoskeletal symptoms were loom type, working posture, daily working time and seat type. Based on the results, some general guidelines for designing weaving workstations were developed. A prototype test showed that the new workstation was acceptable for subject tests and that it improved working posture.

- **Prevalence of Musculoskeletal Symptoms:**

The questionnaire showed that musculoskeletal symptoms were common among weavers. Some kind of musculoskeletal symptoms had been experienced during the last 12 months by 81.17% of the weavers. A comparison of the results of this study with the results of the National Health Survey of Iran [15] revealed that the differences between the prevalence of musculoskeletal problems were significant (Table 5). This indicates that carpet weaving can be considered as a high risk occupation for developing musculoskeletal disorders. Analyses demonstrated that the prevalence rates of musculoskeletal symptoms of different body regions of weavers were significantly different ($p < .05$). Based on the

results of this study, in the carpet weaving occupation, shoulders, the back, wrists, the neck and knees are at a high risk of musculoskeletal problems and should, therefore, be considered a high priority in interventional ergonomic programs.

- **CONCLUSION:**

In industrially developing countries, great efforts are directed towards encouraging the development of small-scale industries as the engine for growth of their economics [6]. If the carpet industry is to work as a powerful engine to bring fruitful economic outcome, it should receive appropriate attention from different viewpoints, above all ergonomics. The present study showed that there was a high rate of poor working conditions and musculoskeletal problems in the Iranian hand-woven carpet industry. Thus, improvement of working conditions and control of musculoskeletal disorders risk factors seem essential. Several factors relating to the ergonomic conditions were found to be important in relation to musculoskeletal problems, especially loom type, working posture, daily working time and seat type. Musculoskeletal symptoms were also associated with individual factors including age, gender, marital status and job tenure. The majority of ergonomic shortcomings and important factors for musculoskeletal symptoms in weaving operations originated from ill-designed weaving workstations. It can, therefore, be concluded that any working conditions improvement program in this industry has to focus on designing ergonomic-oriented weaving workstations. The new weaving workstation based on the developed design guidelines was generally acceptable to the weavers and contributed to an improved working posture. The results of the prototype test demonstrated that the new design improved working conditions and, consequently, might reduce prevalence of MSDs symptoms. Although working posture and workstation adjustability have been considerably improved in this prototype, further work is needed to develop quantitative guidelines for optimizing the working posture.

Actually the TENUN DUDUK is Indonesian cultural fabric manufacturing technique. TENUN DEDUK is amazing ART. PT PISMA PUTRA TEXTILE Established in 1999, PT Pisma Putra Textile has been developing for more than a decade and is building a big step as an export company in the competitive business world. PT Pisma Putra Textile is one of the most trusted yarn spinning manufacturers in the world market. Offering originality and diversity of products to meet the desires of consumers worldwide, our yarn spinning process applies the latest technology and innovation at every level of the production process. Located on 15 hectares of land in Pekalongan with 104,500 spindles we have a production capacity of 9,000 bale every month, PT Pisma Putra Textile is a producer of raw materials for PT Pismatex Textile and PT Pisma Garment Indo. Since 2001, we have started exporting to countries such as Japan, Egypt, Turkey, Korea, Brazil, Sudan and others.

- **REGARDS:**

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