OUTCOME 3

#IndustryPH
Strengthening Industries for Global Competitiveness

Department of Science and Technology

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OUTCOME 3 **#INDUSTRYPH | STRENGTHENING INDUSTRIES FOR GLOBAL COMPETITIVENESS**

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FOREWORD

Science Nation. The phrase is not an apt description for our country of 7,107 islands. Not yet.

The key to make the Philippines a real "Science Nation" is information. With information, programs and technologies developed or funded by the Department of Science and Technology (DOST) – as well as other locally crafted technologies which help solve the country's multi-sectoral problems - become known among Filipinos in all corners of the archipelago, thus pushing them to avail or to take advantage of these science-based innovations to uplift their lives.

When such information is cascaded to the Filipino everyman – every Juan and Maria, including those in the so-called "laylayan ng lipunan" - a lot of things are on cue to take place:

Farmers will become more productive and earn more, small enterprises will grow, thrive and be more competitive, industries will be revitalized, technopreneurship will be more prevalent and employment will increase via the Business Process Management (BPM) sector, government services will become more responsive, healthcare services will improve and become more accessible to more Filipinos, opportunities for S&T education especially among the underprivileged will become more available, and the citizenry will be armed with more effective strategies for disaster preparedness and strategies.

What I had just mentioned are the DOST 8 Outcomes – eight specific targets that the Department aims to achieve in the long run via the following sectors: Agriculture (Outcome 1), Enterprise (Outcome 2), Industry (Outcome 3), IT-BPM (Outcome 4), E-governance (Outcome 5), Health (Outcome 6), Education (Outcome 7), and Disaster Preparedness (Outcome 8).

This compendium of seven publications is a tool for delivering such vital information. It presents to you how DOST and its 8 Outcomes address the current problems in each of these sectors, and thus help contribute to the Philippines' economic resurgence. Six of these seven publications tackle one DOST Outcome each, while the seventh publication focuses on both Outcomes 4 and 5.

In short, this collection is a veritable showcase of the Department's various initiatives across these eight sectors, with stories of ordinary Filipinos whose lives have been touched by the possibilities that S&T has to offer. These stories – encapsulated in news and feature articles – were written by information officers from the different DOST agencies. The articles capture in a nutshell the pivotal role of S&T in a nation's journey to progress and prosperity and why, therefore, S&T

should not be taken lightly by any nation, much less a developing country such as the Philippines. S&T, on the contrary, should be at the forefront of government efforts to drive the country forward and sustain this horizontal trajectory. S&T therefore, should not take the backseat.

This particular publication – titled **#IndustryPH Strengthening Industries for Global Competitiveness** focuses on DOST's Outcome 3 which is Industry. For this Outcome, DOST aims to develop state-of-the-art facilities and capabilities that enable local industries to move up the value chain and attain global competitiveness. The Department has benchmarked technologies being used in countries touted as leaders in specific industries – such as food processing technologies being used by a firm considered to be an industry mover in one country, and which are not yet available in the Philippines. DOST will compare these foreign technologies with those used by local counterparts. The Department will then implement projects for local companies to level up their products and services, and thus corner a bigger portion of their market and achieve a growth rate that will catapult the local firm into a status equal to that of its foreign competitors, and thus grab a bigger slice of the global market.

Indeed, information is one of the starting blocks for the country's successful run toward being the definitive Science Nation that it should be. For it is only through complete, accurate, comprehensible, and timely information that mass or public awareness is generated. If the public is aware of scientific and technological developments, they now know how to improve their lives, and thus take action to make this a reality. If there is action, S&T then gets the chance to show off its full capability: rolling its veil of magic across the sectors, over the entire nation, to wrap the entire Philippine population with the bountiful fruits of harnessing its S&T resources. All these, for the welfare and the future of the Filipino.

I humbly invite you to read the stories in this publication and in all of the other six publications as well. In reading these, not only will you get a sense of S&T's importance to a nation, you will also learn how S&T can actually touch your life and that of your family, how it can help you fulfill your dreams, keep you safe and healthy, and allow you to touch other people's lives as well.

Reading these stories will make you realize that S&T has always been a part of our lives and will always be. All we have to do is acknowledge it, use it, and maximize it.

When we do, we're well on our way to becoming a real "Science Nation."

DR. ARISTOTLE P. CARANDANG
Chief, Communication Resources and Production Division
Department of Science and Technology-Science and Technology Information Institute (DOST-STII)

MESSAGE

The engine of economic growth in First World countries is industry - the same mould that will catapult our country to greater heights with science plus technology and innovation as a sustainable development formula.

This book shows how the Department of Science and Technology (DOST) started revolutionizing traditional industries by transforming them into growth channels and by creating new industries that will ensure our country is in the best position of advantage in the global economic arena.

We have documented the different niche industries where our strength lies and where the Filipino mind, talent, and expertise are best used. As you go through the pages of this book, you will come to know of the different industries that will fuel economic prosperity in the near future: innovative transport solutions like the hybrid electric road train and Maglev train; advanced testing facilities and the die and mold center; gamma ray scanning technology; Food Innovation Centers; engineered bamboo with industrial application; and organic farming, among others.

I am elated in showcasing what we can do with what we have, we at the DOST continuously nurture a culture of innovation where science and technology take precedence in our pursuit to achieve inclusive growth.

Enjoy this unique read as it will tickle your imagination so you can be part of creating and recreating industries that will determine where our country will be a decade or two from now.

RAYMUND E. LIBORO
Assistant Secretary

MESSAGE

The Department of Science and Technology's (DOST) information arm – the Science and Technology Information Institute (STII) – is proud to present "#IndustryPH Strengthening Industries for Global Competitiveness" for Industry, a collection of inspiring, relevant, and interesting stories of ordinary men and women around the archipelago whose lives have been changed by science and technology (S&T) and the people who have helped make this possible. Side by side with these stories are informative articles about DOST-developed technologies and its various initiatives poised to elevate the Filipino's standard of living in ways that only an all-encompassing game changer can do. That game changer is of course, S&T.

"Science and Technology: Changing the Game" for Industry is part of a compendium chronicling the DOST 8 Outcomes – or eight thrusts for the Philippines as it fulfills its mandate to "provide central direction, leadership and coordination of scientific and technological efforts and ensure that the results therefrom are geared and utilized in areas of maximum economic and social benefits for the people."

This particular publication is all about Outcome 3 which is geared toward Industry. To achieve its plans and vision for Philippine industries, DOST builds state-of-the-art facilities for local industries to rely on for their production processes and enable them to move up the value chain and thus generate more value-added to their products and services. And in moving up the value chain, local industries may now slug it out with their foreign counterparts in the global market.

Some of DOST's efforts are detailed here, giving the readers a bird's eye view of how DOST is navigating its roadmap for Philippine industry players, with S&T resources as its well-oiled wheels.

Yet, Industry is just one of its 8 Outcomes. The others are: **Agriculture** (Outcome 1), **Enterprise** (Outcome 2), **IT-BPM** (Outcome 4), **E-governance** (Outcome 5), **Health** (Outcome 6), **Education** (Outcome 7), and **Disaster Preparedness** (Outcome 8).

Together, DOST's projects across these 8 Outcomes will help keep the country on course, and keep its desired results on target.

For this end, STII will keep on churning timely, accurate, and easy-to-understand information to help make the DOST mission complete. After all, it is through information via publications such as this that scientific and technological advancements – key ingredients for national development – are made known to policy makers, leaders, and the general public who are ultimately the beneficiaries of well-utilized S&T resources.

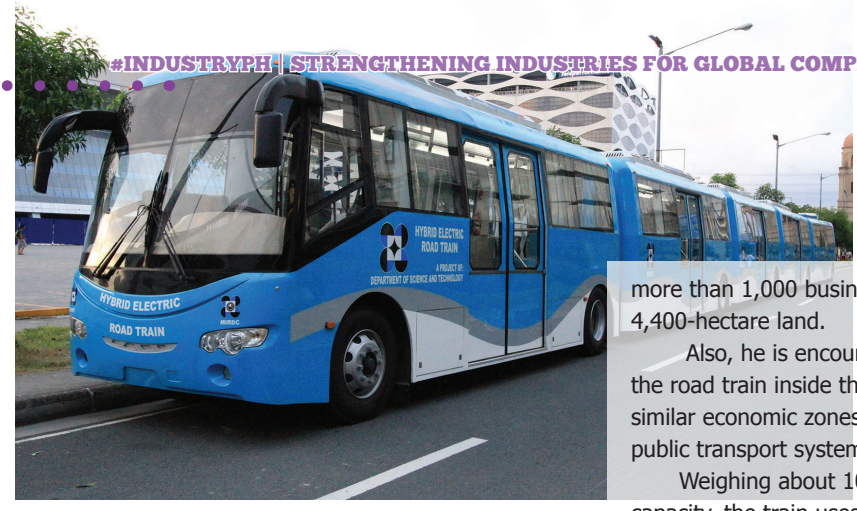
May the reader find this publication useful – for his daily life, his education, his work and livelihood, his family, for the present, and most of all, for his

RICHARD P. BURGOS
Director, STII

The Department of Science and Technology's Hybrid Road Train

Clark Freeport may adopt DOST Road Train

By **JOY M. LAZCANO,** *DOST-STII*



Clark Freeport has expressed the possibility of adopting the Hybrid Road Train system of the Department of Science and Technology (DOST) to ferry employees from various locators of the Freeport zone, during a media tour and demo ride at the Clark Freeport Parade Grounds.

Eyed as one of the possible solutions to ease Metro Manila's traffic congestion and public transport woes, the Hybrid Road Train is a 40-meter long system of interlinked and airconditioned coaches. It is estimated to serve 650,000 passengers a day when it is rolled out, or 60 passengers per coach for a total of 240 passengers. The train can run at a top speed of 50kph.

Arthur P. Tugade, president of the Clark Development Corporation, opened the idea of ferrying passengers from Clark Airport to the Freeport facilities. "I've discussed this with Secretary Montejo and what we want is to have an efficient mass transport system that is RFID (Radio Frequency Identification) compliant and WIFI ready," he explained.

However, Tugade prefers to have a smaller type of train to fit the needs of the Freeport which has more than 1,000 business locators on its 4,400-hectare land.

Also, he is encouraging DOST to roll out the road train inside the Clark Freeport so that similar economic zones may adopt the same public transport system in the future.

Weighing about 10 metric tons in full capacity, the train uses ordinary rubber tires so there is no need for rails and is equipped with dual braking system for efficient braking.

It is environment friendly, with the last of the five coaches dedicated to its electric power batteries which are used alternately with its diesel fuel. It is also cost-effective since most of its parts are locally sourced like the coaches which are fabricated locally.

The road train project is part of the three-component projects of DOST's Advanced Transport Program under the Makinarya at Teknolohiya Para Sa Bayan Program or MakiBayan.

According to Dr. Rio S. Pagtalunan, chief of the analysis and testing division of DOST's Metals Industry Research and Development Center (DOST-MIRDC), the train system is still the most efficient public mass transportation system that is why the Science Department is looking at developing an innovative transportation system out of the train system model.

Inventor Jose L. Guardo Jr. explains the maglev technology to (top photo, from left). Dr. Anthony C. Sales, regional director of DOST-11; Dr. Aristotle P. Carandang, chief of the Communication Resources and Production Division of DOST's Science and Technology Information Institute; and Engr. Edgar I. Garcia, director of DOST's Technology Application and Promotion Institute, and others who visited the 2015 Regional Invention Contest and Exhibits at the NCCC Mall in Matina, Davao City. *(Photo by Henry A. de Leon, S&T Media Service, DOST-STII)*

Davao inventor develops 'Maglev' train, DOST to support prototype

By JOY M. LAZCANO, *DOST-STII*

Matina, Davao City - An inventor based in this city proposes a cutting-edge technology solution to end the mass transport woes: a magnetic levitation or maglev train system.

Maglev technology is an efficient mass transport system that uses magnetic levitation to move vehicles without touching the ground. It travels along a guideway similar to the Department of Science and Technology's Automated Guideway Transit in UP-Diliman and in Bicutan, Taguig City. Moreover, maglev technology can only be seen in some progressive countries such as Germany, China, and Japan among others.

Meanwhile, inventor Jose L. Guardo Jr.'s solution to the public transportation problems went public in style during the 2015 Regional Invention Contest and Exhibits at the NCCC Mall, Matina, Davao City.

Guardo's patented maglev technology is an elevated ultra-lightweight, mid to high-speed hybrid monorail that uses dynamic hybrid magnetic array rotary propulsion wheel system, which according

to him is ideal in transporting commuters from the urban and provincial route.

This means that at the bottom of the coach are components with a mix of electromagnets and neodymium iron boron, a rare earth magnetic material. These magnets are designed to create repulsions from the lower part that enables the train to levitate and propel the coach.

The train is also capable of making sharp curves of up to 15 meters. It has a track width of about 1.8 meters x 2.5 meters, which may still give the public the needed view of the Manila skyline.

It can run as fast as 200 kilometers per hour and can slow down a bit for shorter runs.

According to Guardo's manuscript, the development of the maglev is cheaper as it will use aluminum as guideways. It will also use regenerative energy that returns energy to an inverter when the motor decelerates. Solar panels shall be installed on the terminal rooftops.

The maglev technology was a product of 15 years of research and development. According to Guardo, he was so fascinated with magnets in his younger years which boosted his interest on levitating cars as seen in some sci-fi movies of his youth. His previous attempt at magnetic levitation was done through an elevator system which he called Multi Car Cyclic Magnetic Elevator. In 2005, he invented the hybrid maglev monorail together with Domingo Peñaloza while the two were in Shanghai, China.

DOST support to inventor

During the opening of the Regional Invention Contest and Exhibit (RICE) in Region 11, Technology Application and Promotion Institute Director Edgar Garcia shared with the inventors the importance of their contributions to the country's economic status. He further explained that inventions, which are eventually turned into patents and ultimately become products that employ hundreds of thousands of Filipino workers, help in the advancement of the Philippine economy and improve the lives of many people.

He elaborated that the country is steadily producing patents through various inventions that became commercially available in both local and international markets. Patents, Garcia said, is one of the basis for a country's global competitiveness. "Before we were ranked 85th among the 147 countries in the global competitiveness rankings, but now we are at 47th and the Philippines is the fastest ASEAN country to achieve such feat," says Dir. Garcia. "That is why the DOST's support to our inventors is in full swing."

This fit well for Guardo as during the RICE press conference that immediately followed, DOST Region 11 Director Anthony Sales and Director Garcia gave their commitment in further developing the maglev train system into a working prototype. Director Sales says that a one-kilometer track requirement suggested by the maglev proponents shall be installed in the DOST property in Bago Oshiro in Davao City to further develop and test the reliability of the invention.

Moreover, Dr. Aristotle Carandang of the DOST-Science and Technology Information Institute believes that the development of the maglev technology shall be expedited as DOST already has the capability and the facilities to develop rapid prototyping of the components needed. This is through the Makinarya at Teknolohiya Para sa Bayan or MakiBAYAN program of the DOST under the Metals Industry Research and Development Center.

DOST, EVSU launch Food Innovation Center in Tacloban City

By **ALLAN MAURO V. MARFAL,** *DOST-STII*

Tacloban City, Leyte- Maximizing the potential of available raw materials to strengthen the local food sector in the region is considered by Department of Science and Technology (DOST) as an essential driving force to speed up the current rehabilitation in Yolanda-affected areas in Visayas.

To achieve that, DOST, together with Eastern Visayas State University (EVSU) officially launched the Eastern Visayas-Food Innovation Center (EV-FIC) last September 26, 2015 at EVSU's main campus in Tacloban City, Leyte.

EV-FIC is a facility that gives opportunities for local residents to develop their ideas and concepts in the field of food processing into innovative and marketable products.

The said center offers range of services that include extensive trainings on food development process and technical consultancy, as well as packaging and labeling design.

The equipment housed in EV-FIC are vacuum fryer, freeze dryer, water retort, and packaging machine among others.

"Equipping and enabling our local micro, small, medium entrepreneurs (MSMEs) to create world-class food products is an integral part of our mission to bring inclusive development in different places in the country. With the establishment of Food Innovation Center in Eastern Visayas, we are confident in DOST that local food manufacturers in the region could prove that they are not merely an engine of economic growth but rather they are the critical engines of inclusive growth," said DOST Secretary Mario G. Montejo.

Sec. Montejo also said that MSMEs are responsive to the country's development agenda not only when it comes to providing employment opportunities but also in terms of manufacturing products, which addresses food security, promotes health and nutrition, supports tourism and offers solutions that impact the lives of Filipinos.

"As an important hub for innovation, this center will lead in conducting research and development in the field of food development process in the region. The said facility will also be the training ground for would-be entrepreneurs to capacitate and enhance their skills and ideas in making local food products," said EVSU President Dominador Aguirre.

DOST Region VIII director Edgardo Esperancilla shared that since January 2015, EV-FIC has already developed 59 local food products.

The launching of EV-FIC was part of the week-long celebration of the 2015 Visayas Cluster Science and Technology Fair which ran from September 23 to 26. Hosted by DOST-Region VIII office, the said event featured innovative, cost-effective, and appropriate technologies to make the agriculture, food, industry, and service sectors more competitive. Showcasing of exhibits and conducting of technical fora were held at Ormoc City Superdome in Ormoc City, Leyte.

Ilocano Food Innovation Center. DOST Secretary Mario G. Montejo (second from right) leads local officials of Ilocos Norte in the ribbon cutting ceremony during the launching of the DOST-Mariano Marcos State University (MMSU) Food Innovation Center inside the S&T Park of the MMSU campus in Batac, Ilocos Norte. Assisting Secretary Montejo are (from left) Batac City Mayor Jeffrey Jubal C. Nalupta, Dr. Prima Fe R. Franco, OIC of MMSU and Atty. Windell Chua, provincial administrator of Ilocos Norte representing Governor Imee R. Marcos. The food innovation center will provide research and development services and technical assistance to micro, small and medium enterprises engaged in food processing and other allied ventures to level up product standards, quality and affordability of Filipino innovative food products.

DOST, MMSU put up Food Innovation Center in Ilocos Region

By RODOLFO P. DE GUZMAN, *DOST-STII*

BATAC, Ilocos Norte -- Diverse unique food products and delectable gastronomic treats greeted guests as well as government officials and members of the academe during the formal launching of the Food Innovation Center at the S&T Park of the Mariano Marcos State University (MMSU) recently.

The Food Innovation Center is a joint project of the Department of Science and Technology (DOST) through its Region I office headed by Dr. Armando Q. Ganal, MMSU, the National Economic Development Authority (NEDA) and the Development Bank of the Philippines (DBP).

The center, housed in a newly constructed building inside the sprawling 1,300-hectare property of the university, will be a learning hub for research and development in food production and processing of agricultural crops into high value products that can be marketed locally and abroad.

Inside the facility are locally fabricated machineries and equipment used in food processing like the water retort, a manually operated pressure cooking vessel that processes food packed in sealed containers. The center also houses a spray dryer that dries heat-sensitive materials such as food and pharmaceutical products made of slurry paste gel or suspension. Other equipment include the vacuum fryer donated by DOST, vacuum packaging machine, liquid and solid foam fill machines acquired through MMSU-NEDA-DBP project, and the ceramic water filter.

"With the creation of the Food Innovation Center here in Ilocos Norte, we shift opportunities from Manila to the countryside and increase economic development in the regions. The Filipinos are blessed because of their creativity to produce new products through science and technology," said science chief Mario G. Montejo.

Montejo further stressed that the Philippines is moving toward creating a vibrant food processing industry that can rival that of Thailand that produces roughly 4,000 new products every year. So far, he said that the Industrial Technology Development Institute or ITDI, an attached agency of the DOST, has committed to develop around 2,000 new products from a variety of agricultural crops abundant in the regions.

Montejo also mentioned that DOST's drug development program that focuses on locally abundant herbs will also use the center for research purposes. "The DOST's Tuklas Lunas program is one example of how these kinds of machineries and equipment in the FIC are able to produce high quality and affordable drugs and health products using indigenous medicinal plants abundant in the countryside," Montejo added.

On the other hand, the host province welcomed the putting up of the Food Innovation Center in Batac as it will spur economic development in the region and create employment opportunities for the Ilocanos, well known for being inherently hardworking, creative and resilient.

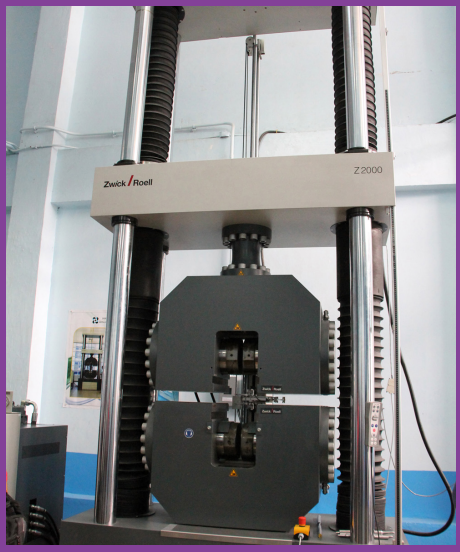
"The Center is a milestone in our pursuit of excellence in science and technology that will unlock the doors to prosperity… kailangan natin ang innovation at groundbreaking ideas. Katulad ng mais, mura ito at pwedeng gawing chichacorn… mahal na ang presyo (pag na-proseso). With this we create more marketable products using our harvest. As we put value added production, we will earn more and it will create a vibrant food industry," said Atty. Windell Chua, provincial administrator of Ilocos Norte, reading from the message of Governor Imee Marcos.

According to Dr. Fe R. Franco, officer-in-charge of the MMSU, the Center will pave the way for leveling up local S&T food products with those from our Asian neighbors. She also presented to Secretary Montejo the pledge of commitment of MMSU in this endeavor.

"The Center will provide means to achieve food security for Mang Juan and Aling Maria and through this initiative we will be able to encourage business owners to go into the food processing industry since we have the Technology Business Incubator program that will support this," stated Dr. Franco.

The launch of the Center was capped by a tour of the facility, food tasting and sampling, and a mini press conference where guests were able to see up close the different food processing equipment.

Aside from Secretary Montejo, others present were DOST Region I Director Dr. Armando Q. Ganal and Batac Mayor Jeffrey Jubal C. Nalupta.



DOST Assistant Secretary and Officer-in-Charge of Metals Industry Research and Development Center (MIRDC) Roberto O. Dizon (left) accompanies DTI Undersecretary Adrian Cristobal (middle) and other guests in one of the areas at the Auto-Parts Testing Facility located at the MIRDC compound in Bicutan, Taguig City. The said testing facility was launched last June 18, 2015, as part of the Metals and Engineering (M&E) Week celebration. It will serve as a testing center for local parts manufacturers so that expenses incurred from overseas testing will be minimized. (Photo by Ceajay N. Valerio)

DOST testing facility to speed up auto industry

By ALLAN MAURO V. MARFAL, *DOST-STII*

The Department of Science and Technology (DOST) is looking forward to accelerating the growth of the local automotive industry by helping it to produce high-quality auto parts.

DOST's Metals Industry Research and Development Center (MIRDC) recently launched its Auto-Parts Testing Facility in Bicutan, Taguig as part of the weeklong celebration of Metals and Engineering or M&E Week.

The facility will serve as a testing center for local auto parts manufacturers so that expenses incurred from overseas testing will be minimized. Housed in the facility are more than 30 pieces of equipment performing different testing services for automotive and other metal-related industries, such as hardness measurement of metallic material and rubber, thickness measurement for base metal, simulated crash analysis, tire endurance testing, and accelerated corrosion tests.

"The reason why this project was conceptualized is to address the challenges faced by the automotive industry firms, both assemblers and parts manufacturers, in terms of product improvement" said Engr. Florante Catalan, chief of MIRDC's physical laboratory section.

According to him, the Philippine automotive industry is relatively small when compared to its ASEAN neighbors in terms of number of players and their production size. Thus, there is a need for government not to hit the brakes on the industry's growth, but instead accelerate its technological advancement.

Catalan also pointed out that "the One ASEAN policy that is implemented starting this year is one of the major reasons why this project was developed. Local parts manufacturers shall be able to produce products with high quality at a competitive cost against imported automotive parts and components manufacturers from other ASEAN member countries."

During M&E Week, DOST also signed a Memorandum of Understanding with the Motorcycle Development Program Participants Association, Inc., Motor Vehicle Parts Manufacturers Association of the Philippines, and Mechatronics and Robotics Society of the Philippines as the Department's newest partners under its MakiBayan initiative.

Short for "Makinarya at Teknolohiya para sa Bayan," MakiBayan aims to spur the growth of the metalwork and related industries by providing a roadmap outlining R&D thrusts for the industry to achieve more sustained growth and overall development.

For more information about the Auto-Parts Testing Facility, send an email at mirdc@dost.gov.ph or call 838-78-78.

Local engineered bamboo industry can look forward to better days

By **RIZALINA K. ARARAL**, *DOST-FPRDI*

The humble bamboo has gone a long way. From being called "the poor man's timber," it now graces many high-end homes, hotels and offices around the world, as attractive engineered panels, floors, furniture and handicrafts.

The global market for bamboo products amounts to US$12 billion and much of this is for the engineered bamboo sector.

"We are happy to say that the Philippines now has its own engineered bamboo industry," says Dr. Romulo T. Aggangan, director of the Department of Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI). "Although still immature and bugged by various problems, it is also blessed with a lot of strengths, and given enough support from concerned groups, can be expected to grow strong, and in time be able to meet the needs of local clients or even capture a slice of the global market."

According to Dr. Rico J. Cabangon, also of FPRDI, "Engineered bamboo includes a wide range of products made by binding together bamboo veneers, strands, fibers, strips or slats, woven mats or flattened bamboo with a suitable glue to form a composite material designed to meet specific needs. It is often stronger and less prone to warping than equivalent solid woods."

In the Philippines, there are about 10 companies making engineered bamboo products. Most of them are small-scale enterprises producing items on a per order basis. The most common species they use are kawayan tinik (Bambusa blumeana), giant bamboo (Dendrocalamus asper), bolo (Gigantochloa levis), botong (D. latiforus) and bayog (B. merrilliana).

These are not easy days for the young industry. It does not have enough supply of bamboo poles, the quality of poles is low, and

the price is high. Also, glues are expensive and producers do not have the means to buy high-capacity machines.

"Fortunately," discloses Dr. Cabangon, "these weaknesses are offset by a lot of plus points. For instance, there is at present a huge national demand for engineered bamboo. Since 2010, it has been mandated by law that 25% of all school desks and furniture in the country's public schools should be made of engineered bamboo."

To meet the projected annual demand of 312,000 school desks and other saleable products such as panels, flooring, decors and high-end furniture, about 10,000 hectares of plantations must be established using the right bamboo species.

"Good thing there are government projects that push for the development of plantations," reports Dr. Cabangon. "These include those of the DENR and the National Greening Program which lists bamboo as a priority reforestation species.

"Likewise, we also have R&D agencies which are studying advanced methods of mass producing bamboo planting materials and checking if some lesser-used species may also be fit as raw materials."

Dr. Cabangon lists the other strengths of the local engineered bamboo industry: availability of cheaper yet effective glues in the market, availability of labor force, as well as several groups, both private and public, which are ready to help the industry in various ways – from standardizing product quality, manpower training, machine design and fabrication, R&D, and financing.

Engineered bamboo flooring

In machine design and fabrication, for instance, FPRDI has developed the bamboo flattening machine and the bamboo veneer lathe specifically for the engineered bamboo producers. "It is important that all the industry's strengths are tapped," he adds, "considering that the world market for engineered bamboo can reach US$20 billion by 2020."

One of the biggest boosts to the sector was the creation in 2010 of the Philippine Bamboo Industry Development Council thru Executive Order 879. Tasked to provide policy and program directions, it is expected to push for robust and sustainable bamboo enterprises nationwide, with the help of both government and private groups.

"In the end," concludes Aggangan, "the strength of the country's engineered bamboo sector is in people. The policy-makers, researchers, foresters, trainers, machine engineers, product designers, artisans, plantation owners and farmers, and bamboo enthusiasts who see the industry's potential are willing to give it the necessary push."

To know more about engineered bamboo and other FPRDI technologies, contact FPRDI at (+6349)536-2586/ 536-2360/536-2377.

From pest to pesos, thanks to DOST

By **RIZALINA K. ARARAL,** *DOST-FPRDI*

Australian scientists have called the water hyacinth "the world's worst aquatic weed," clogging rivers, dams, lakes and irrigation channels in every continent except Antarctica. It destroys aquatic environments and costs billions of dollars a year to control.

Yet, some sectors have found a use for the water hyacinths, turning these aquatic pests into a worthwhile venture churning out thousands of pesos. More specifically, they have made a livelihood out of water hyacinth processing for products such as classy wall coverings.

And thanks to the Department of Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI), many families living near the Laguna Lake have found a source of extra income, as more and more livelihood coops in the area are getting involved in water hyacinth processing.

FPRDI developed the Water Hyacinth Dryer which reduces the drying time of water hyacinth stems from about a week to only a few hours. This allows the stems to be better protected from molds. At the same time, it allows small and medium-sized businesses to maintain and even raise their production as they are able to thoroughly dry their materials during the rainy months.

"Mayor Bernardo San Juan, Jr. of Cardona, Rizal has reported that using the dryer, the cooperative Samahang Kababaihang Barangay Patunhay (KBP) plans to double their production capacity to 50,000 stems per week," said FPRDI's Wency H. Carmelo. "Most of the coop's dried and pressed water hyacinth stems are bought by the Magic Clean Company which turns them into high-end wall coverings exported to 45 countries," he added.

To know more about the water hyacinth dryer and other FPRDI technologies, contact FPRDI at (+6349)536-2586/ 536-2360/536-2377.

Low-cost handicraft dryer from DOST helps Japanese designer

By **RIZALINA K. ARARAL,** *DOST-FPRDI*

Wataru Sakuma makes world-class decors from handmade paper which in turn comes from agricultural wastes.

The low-cost handicraft dryer is a cheaper, safer, and cleaner way for Masaeco to dry its products.

Wataru Sakuma, a Japanese designer based in the Philippines, is one of the newest adopters of the Department of Science and Technology - Forest Products Research and Development Institute's (DOST-FPRDI) low-cost handicraft dryer (LCHD).

His company, the Cavite-based Masa Ecological Development, Inc. (Masaeco), is the maker of eco-friendly and world-class handmade paper products made mostly of local agricultural wastes such as pineapple and banana fibers and cogon grass. Sakuma's masterpieces are exported to the US, Europe, Japan and Australia.

"We make around 100 sheets of paper daily, each measuring 250 cm X 100 cm, and we convert these into art panels, wall decors and lamps," says Sakuma.

He reports that his 35-cubic meter LCHD has helped his company to dry its products more efficiently.

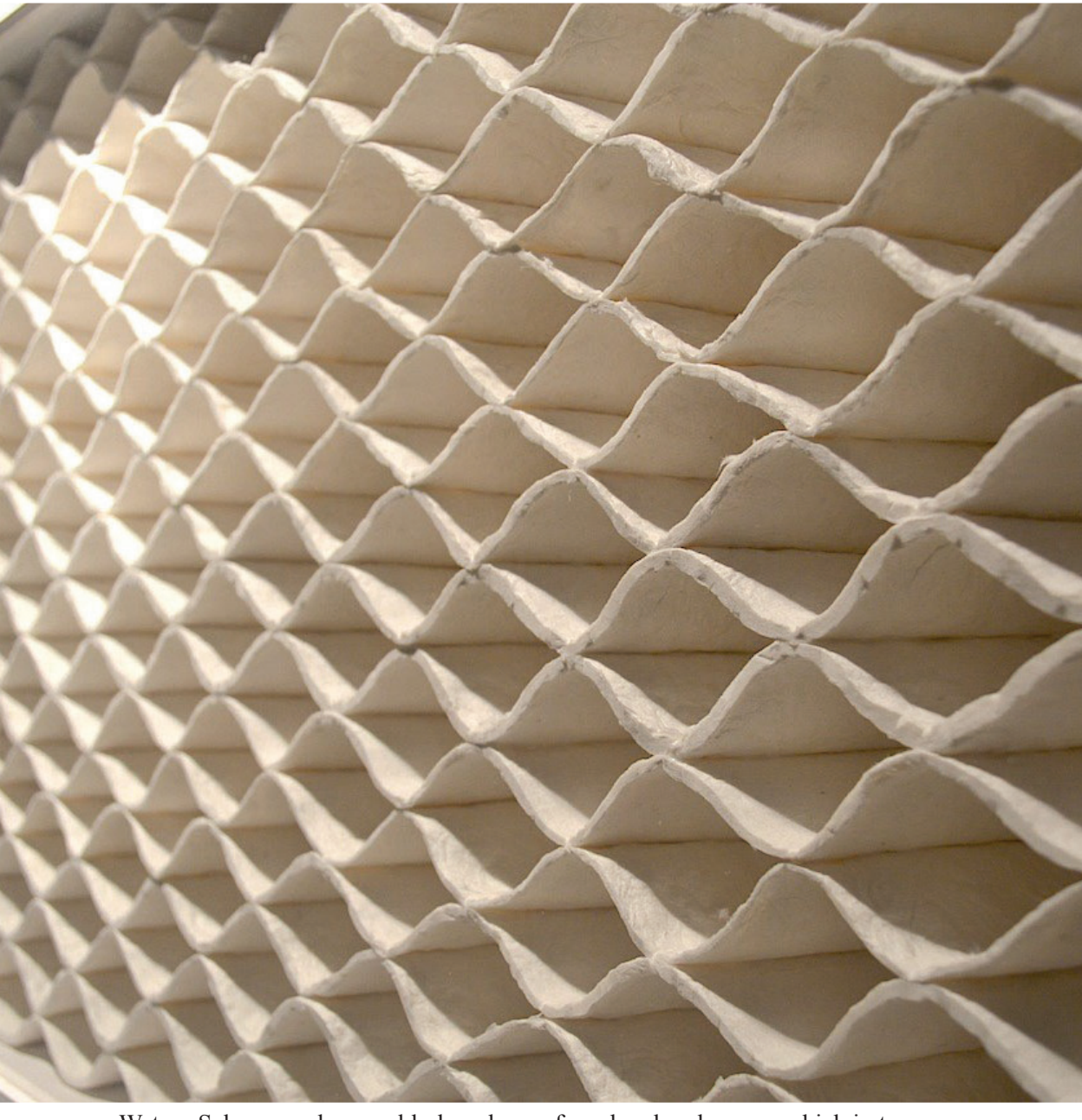
Developed by an FPRDI research team led by Wency H. Carmelo, the LCHD uses 22 percent less wood fuel and is 40 percent cheaper to build than the FPRDI furnace-type lumber dryer.

"We now have an easier and safer way of drying paper," reveals Sakuma. "This gives us more control of the process, unlike before when we simply exposed our products to a direct heat source. This was a messy system that made a lot of ash which often soiled our products."

Without the ash problem, the sheets of paper are now cleaner and they have fewer rejects. They also doubled their production, with the new dryer being twice bigger than their old one.

"Compared to our old kerosene-fired dryer, the handicraft dryer allows us to save as much as P 60,000 – 70,000 a month on fuel cost," Sakuma adds.

The LCHD is one of several local



Wataru Sakuma makes world-class decors from handmade paper which in turn comes from agricultural wastes.

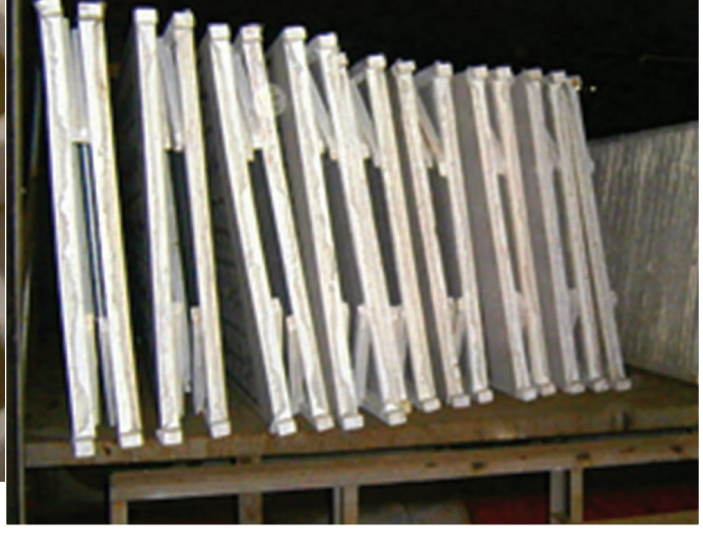
technologies developed by DOST for industry use. "They are useful, effective and cost-efficient, proof that our local experts have the capability to come up with excellent, world-class products," said DOST Secretary Mario G. Montejo. "A technology such as the LCHD is so efficient and high performing that even foreigners appreciate what our own people have made."

According to the Japanese designer, they found the handicraft dryer so useful that they decided to install another unit this year. "Within the next few years, we will probably need a third one," he relates.

His fresh product designs have earned for the artist the coveted Katha Award in 2005, 2006 and 2009. A highlight of the Department of Trade and Industry's Design Week Philippines, the Katha Award is "given to designers and exporters whose products embody exceptional quality and high-caliber design in furniture, housewares and furnishings, holiday décor and gifts, and fashion."

"Masaeco not only allows me to earn while expressing my artistry," Sakuma shares. "It also allows me to pursue another passion – giving jobs to young people in the provinces."

To know more about the low-cost handicraft dryer and other FPRDI technologies, contact FPRDI at (+6349)536-2586/ 536-2360/536-2377 or email at info@fprdi.dost.gov.ph.



The low-cost handicraft dryer is a cheaper, safer, and cleaner way for Masaeco to dry its products.

Local manufacturers express support for DOST die and mold center

By JOY M. LAZCANO, *DOST-STII*

A surface metal grinding machine is being shown to members of the media at the Department of Science and Technology-Metals Industry Research and Development Center's (DOST-MIRDC) Die and Mold Solution Center (DMSC) during the recent Agham Na Ramdam media briefing on DOST programs and updates. The grinding machine is one of the many precision cutting, grinding and stamping tools inside DMSC which aims to help strengthen the tool and die manufacturing industry in the Philippines and eventually revitalize local manufacturing. *(Photo by Gerardo Palad, S&T Media Service, DOST-STII)*

Local manufacturers have expressed support to the Department of Science and Technology's (DOST) Die and Mold Solution Center (DMSC) during a recent media briefing at DOST's Metals Industry Research and Development Center (MIRDC) in Bicutan, Taguig City.

The DMSC is expected to enable local industries to catch up with neighboring ASEAN countries in terms of manufacturing capability. The facility will fulfill this objective through modern infrastructure support services and capabilities which will connect firms involved in processing of raw materials with firms that convert these into the final product.

According to Chito Madroño, general manager of 13PM Enterprise, the industry needs to have an infrastructure similar to DMSC to boost the manufacturing industry.

13PM Enterprise has been partnering with the government especially with MIRDC since 1978. Madroño reveals that his game "Brain Twister" was a product of public-private partnership, with the game chip pieces having been developed by MIRDC a couple of decades ago. Brain Twister is a tile-based board game which requires a player to form given shapes using four oddly-shaped tiles.

"I went to MIRDC and asked them to fabricate the molds that will be used for the tiles," explains Madroño. "And I am happy because it is cheaper and produced the expected results."

Madroño, who sought MIRDC's assistance for his other board game "Word Factory," reveals that majority of local manufacturers subcontract their manufacturing processes from China because of its cheap overhead costs and faster turn around.

He adds that the country currently cannot catch up with China in terms of production output but with 100 million Filipinos, local manufacturers can rely on the domestic market to boost local production.

Philip Ang, president of the Philippine Die and Mold Association shares Madroño's sentiment. The local market should support local manufacturers as this would equate to more economic gains, Ang said and encouraged the media to come up with more positive news to attract more investors into the country.

In previous years, the Philippines only had 170 tool and die shops serving the local manufacturers compared to Thailand's 1,110. In 2011, the country imported about $50 million of tool and die compared to less than $9 million of exports for the industry.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DOST's Montejo eyes space agency for PH

By **JOY M. LAZCANO**, *DOST-STII*

The Philippines is eyeing the creation of a space agency as the Department of Science and Technology (DOST), through its Philippine Council for Industry, Energy, and Emerging Technologies Research and Development (PCIEERD), formulates a national space technology application masterplan for national programs on disaster preparedness, agriculture, and other sectors.

Space technology applications (STA) such as satellites, help in improving data and communication handling and transfer especially during natural disasters to help mitigate the loss of lives and properties.

DOST-PCIEERD is now spearheading talks with other local space technology stakeholders on the said masterplan which aims to accelerate the development of new technologies and harness the benefits of STA.

According to DOST Secretary Mario G. Montejo, the proposed space agency will lead in the development of space age, intelligent technologies for decision-making for effective and efficient environment, natural resources and disaster management strategies.

In particular, DOST is working with several experts in laying down remote sensing technologies focusing on boosting its weather forecasting and geologic hazards monitoring capabilities as well as emergency response in the local level.

A microsatellite research lab will also be created while satellite-based data will be used in the agriculture sector for drought and crop assessment and forecasting.

DOST will also lead in the establishment of the Philippine Earth Data Resource and Observation at the Department's Advanced Science and Technology Institute, a multi-mission ground receiving station for receiving space-borne imagery from commercial satellites.

Initially, DOST funded several projects including the creation of the Philippine Remote Sensing Society and a regular National Remote Sensing Conference which serves as the forum for the country's space technology program.

Other notable programs under the initiative are the Nationwide Operational Assessment of Hazards or Project NOAH and the Nationwide Disaster Risk Exposure Assessment for Mitigation (DREAM LiDAR) which are now in operation to help the national and local government map out strategic disaster response during typhoons.

Graphene research team members (from left) Szeemaine D. Tigno, Wendell A. Manuel, and Jed Andrew C. Visaya of UP Baguio operate the laser plotter on an optical disc to create a graphene oxide, a material used for the graphene-based electrochemical supercapacitor, a storage device which can charge at a faster rate and can store larger amounts of energy. *(Photo courtesy of Jed Andrew Visaya)*

Fast charging, long lasting battery now in the works by DOST, UP

By **JOY M. LAZCANO**, *DOST-STII*

A fast charging, high-capacity battery is what the Department of Science and Technology (DOST) and faculty members from the University of the Philippines (UP) Baguio are working on to boost the energy storage capacity of solar cells.

The battery is called graphene-based electrochemical supercapacitor, a storage device that can charge at a faster rate and can store larger amounts of energy compared to ordinary batteries or capacitors.

Graphene is a thin layer of pure carbon with a single, tightly packed layer of atoms bonded together in a hexagonal honeycomb pattern. It is 100 times stronger than steel by weight and has extraordinary properties.

"What if you can charge your energy storage device in less than a minute?" asked project leader Dr. Ian Jasper A. Agulo of UP Baguio. He added that its inherent strength makes it possible to be charged and discharged 100 times longer than ordinary batteries.

"Currently, we are experimenting on red and blue lasers mounted on 3D printers in order to make graphene supercapacitors," Dr. Agulo revealed about the project which is supported by DOST's Philippine Council for Industry, Energy, and Emerging Technologies Research and Development.

Dr. Agulo shared that his team uses graphite oxide spread through an ordinary optical disc. When the graphite oxide dries up, it is then heated up using laser.

The abundance of carbon in the human body and in the universe makes graphene an ecologically friendly and sustainable source of material for an almost limitless number of applications.

Explained Dr. Agulo, "Electric cars require high specific power storage device to work while mobile phones require high specific energy device to run a longer time. However, graphene-based electrochemical supercapacitors posses both these characteristics which is why it can be used on a wide range of consumer electronics and energy harvesting applications."

The team emphasized that the graphene supercapacitor will complement lithium-ion devices as this will boost the battery's capacity and enhance its charging capability.

TROPICAL FABRICS SET TO ENTER MAINSTREAM VIA NEW DOST FACILITY. Department of Science and Technology (DOST) Secretary Mario G. Montejo (left) examines one of the newly acquired equipment for the Innovation Center for Yarns and Textiles during its launching last May 25, 2015 at DOST's Philippine Textile Research Institute (PTRI) in Bicutan, Taguig City. A P 54M flagship project of PTRI, the said Innovation Center aims to put tropical fabrics such as piña and banana in the mainstream by producing more yarns of abaca, banana, pineapple and other indigenous fibers and make them available to handloom weaving communities and commercial millers or knitters in the country. *(Text by Ma. Luisa S. Lumioan / Photo by Henry A. de Leon, S&T Media Service, DOST-STII)*

New DOST facility to help put tropical fabrics in mainstream market

By **MA. LUISA S. LUMIOAN,** *DOST-STII*

Clothing made from tropical fabrics such as piña and banana are usually used only during weddings, baptisms, burials and other special occasions. The Philippine Textile Research Institute of the Department of Science and Technology (DOST-PTRI) however is keen on making tropical fabrics more mainstream.

The establishment of PTRI's P 54M Innovation Center for Yarns and Textiles (ICYT) that will produce yarns customized to customers' and industry needs is a step closer to this goal which is part of the bigger objective of revitalizing the textile industry in the country.

"We aim to make indigenous yarns accessible to our handloom weaving communities as well as commercial millers or knitters," disclosed PTRI Director Celia Elumba during the launch of the Innovation Center last May 25, 2015 at the PTRI Compound, DOST Complex, Bicutan, Taguig City.

Dir. Elumba also revealed that PTRI has partnered with Power Fashion, the company behind the local clothing brands Unica Hija, Vise Versa, and Bayo, which has agreed to use locally produced tropical fabrics in one of their capsule collections.

The ICYT is just the first of PTRI's initiatives geared toward reviving the textile industry. Senator Loren Legarda, who graced the launching, expressed support for these initiatives.

Meanwhile, DOST Sec. Mario G. Montejo noted that the DOST's efforts in reviving the industry is part of its contribution to the government's vision of inclusive growth as these are seen to bring economic activity in the countryside.

Promoting the use of tropical fabrics, said Legarda, will not only preserve our culture and heritage but will also help support the agricultural sector. Legarda is the author of the Tropical Fabrics Law which aims to promote Philippine tropical fabrics through the use of such materials for the official uniforms of government officials and employees.

PTRI will also establish regional handloom innovation centers and work on upscaling the natural dye production in the country to complement the Innovation Center.

Despite the decline of the textile industry in recent years, Sec. Montejo maintains his optimism especially with PTRI's research and development initiatives such as developing less costly ways to process agricultural waste into fabrics, producing bamboo fabrics and smart textiles.

MIRDC and Pingol Metal Crafts:
A metal 'casting coup'

By **GERALDINE BULAON-DUCUSIN,** *DOST-STII*


Chris Pingol of Pingol Metal Crafts

"Yung talent mo, tama nang puhunan sa pagnenegosyo mo," (Your skill is enough capital to start a business) was what a brother (priest) from Don Bosco told Chris Pingol's grandfather Mamerto Pingol, when the latter was having apprehension over how to get started in the metalcraft business producing largely church-related products.

Thus, was his motivation to put up a metalcraft business which eventually manufactured the censer used in the religious incense of Pope Francis' masses in Tacloban, Luneta and University of Sto. Tomas during his 2015 visit to the country.

It's the same company which manufactured the trophies used at the Philippine Football Peace Cup in 2014 participated in by the Azkals and three other nations.

Humble beginning

Mamerto Pingol was a production supervisor at a now defunct metalcrafts shop inside the Don Bosco Mandaluyong Technical College. Upon the encouragement of the Don Bosco brothers, Pingol ventured in metalcrafts armed with the necessary know-how. He initially invested P 5,000 and relied on payment deposits from customers, most of whom were referred to him by the brothers. The senior Pingol used to do the crafts at home until he encouraged his brother and children to help him.

Product development

Christopher R. Pingol, or Chris, is the grandson of Mamerto. He took over the business when his father passed away in 2000. Chris was then familiar with production since he used to work in Fujitsu Die-tech. The first thing he did when he took over was to look into the idea of scrap material utilization. His grandfather used to throw or sell off the scraps. But as an employee of Fujitsu, Chris had learned that scrap materials should be recycled.

The younger Pingol then searched the Internet. His search led him to the Metals Industry Research and Development Center (MIRDC) of the Department of Science and

Finished product after molding

Technology. He visited the MIRDC and learned about casting which has been one of MIRDC's services. The agency taught him how the scraps can be transformed into other products by undergoing a casting technology process.

Casting is a common metal's technique which is also available in several private companies. But what sets MIRDC apart, according to Chris, is this:

"Sa mga pribadong kumpanya, kung ano lang pinagawa mo, yun lang yun. Sa MIRDC, kung may item ka halimbawa, tutulungan ka nila talaga [kung] paano mo mapaganda pa yung produkto mo (In private companies, they'll only do what you ask them to. In MIRDC, they go beyond what you ask, and would readily help you improve your product further)."

Chris has been a client of MIRDC since 2000 and he credits MIRDC for making their products look "imported." They are now capable of coming out with products that involve more intricate designs, with more aesthetic value.

MIRDC Metals Technologist Juanito G. Mallari works during the mold and die making phase.

Ceramic mold making *(Photo by Henry A. de Leon, S&T Media Service, DOST-STII)*

"Before we came to know of the casting technology of MIRDC, our products were mostly hammer-finished," Chris said.

"Ngayon may 3-D look na produktong nagagawa namin, hindi na tulad nung de-pukpok pa kami. Sa de pukpok, hindi pwede sculpture-like designs," (Now our products have this 3-D look, unlike in the past when we're doing things manually, we cannot get that sculpture-like finish)," he added.

Chris also attended MIRDC's training seminar on plating (non-cyanide gold plating) and he has been using their library as well to research on other ways to improve their products.

Expansion

From a small business manned by family members, Mamerto Pingol Metal Crafts now has about 40 employees. They have their manufacturing shop in Malabon and a display area in Sta. Cruz, Manila. Peak seasons are during Holy Week, Christmas, and fiestas. During the remaining lean months, the staff do their stocks. To his knowledge, there are only two others engaged in the same business nationwide.

Aside from church products, Mamerto Pingol Metal Crafts also manufactures plates, medals, trophies and interior design. They've done products for the United States, Guam, China and Brazil and they hope to gain more orders from abroad in the future. Chris believes that product expansion is a must in any business. Hence, they are now trying to develop urns to add to their portfolio of church supplies.

Government's tech support

MIRDC's metal casting services began in 1975. It has helped several companies, largely in their product improvements. Among them are Mamerto Pingol Metal Crafts Manufacturing; Shooters, Guns and Ammunition Incorporated; Enrod Copper Decor; SEACOM; and Mechapil.

MIRDC has been servicing 10 to 15 customers per year, on average, in the last five years. There are 18 personnel handling casting services at the Process Research Section (PRS) of the Materials and Process Research Division, most of whom have been with MIRDC for 20 to 35 years. This is a highly skilled group who can share their skills with entrepreneurs needing their assistance in product development.

"While there are private outfits which provide the same kind of service as we do, especially in the area of conventional casting, a number of industries still prefer MIRDC because we have a track record in providing better service in terms of better surface finish, right dimension and almost zero defects," Engr. Florentino Lafuente, a supervisor of PRS said.

The most challenging part of the job, though, according to Engr. Lafuente is the use of alloys whose melting process is something that they're not yet familiar with.

MIRDC now focuses on contract or developmental research, which is product development. The mass production is usually contracted out to the private sector by their customers, who are composed of artists, suppliers, middlemen and others.

Juanito "Boy" G. Mallari, a metals technologist at the MIRDC said that the work at the foundry (conventional and investment casting) can be both difficult and hazardous. He said that those involved in this kind of work must wear safety apparel and must be fully trained.

The challenge for Mallari is the variety of casting jobs they do, especially in investment casting, which are often interesting and encourage one to come up with his/her own idea or technique that does not require high-tech machines.

"For me the reward is when my boss or customers appreciate and gain satisfaction from my work," Mallari said.

DOST supports Filipino creativity via Materials Innovation Center in Cebu

By **RODOLFO P. DE GUZMAN,** *DOST-STII*

Do you have what it takes to be a Kenneth Cobonpue?

Or are you an upcoming couturier of the same caliber as Rajo Laurel or Inno Sotto?

Maybe you are following the footsteps of well-known Cebuano painter Gabriel Abellana?

Whatever form of art you are inclined to take, the Materials Technology Innovation Center (MATIC) may be your home away from home – a sanctuary conducive to unleashing the creative juice of a struggling master of the canvas, a craftsman extraordinaire or a visual artist from out of this world.

Recognizing the overflowing talent of the Filipino in almost all forms of art, the European Chamber of Commerce of the Philippines (ECCP) partnered with the Department of Science and Technology (DOST) in establishing MATIC which is housed at the DOST Complex in Banilad, Cebu City – a center of creative industries in the country.

The facility was put up to support ECCP's materials research and development program for the promotion of creativity and competitiveness in the local design industries through the use of new materials, innovation of indigenous materials, reinvention of designs and utilization of new and efficient technologies.

According to ECCP Branch Manager Rosemel D. Calderon, MATIC is a venue for those who want to increase their design capabilities and make use of mixed media and other innovative materials. At the same time, it will bridge the gap between the academe and the business sector in providing world-class services that will upgrade the capability of local talents to be more competitive in the international market.

The facility has three main features: the app zone, the dashboard and the chatroom. The app zone serves as both the workshop and the library where students can find material swatches, semi-processed materials and books on product development and design. The dashboard is a platform where products are displayed. Lastly, the chatroom is a meeting room for creative discussions and presentations.

Small and medium enterprises engaged in the production of furniture, home decors, fashion design and accessories, woven products, and bamboo-made products among others, will benefit from MATIC. The upgraded skills of artists and craftsmen will be instrumental in creating unique designs and products that will be more competitive in the world market.

"The DOST strongly believes in the Filipino talent and capacity to excel in any field, be it in science and technology or the visual arts. That is one of the reasons why the Department fully supports this initiative aimed at further enhancing our skills and talents to be at par with the world's greatest artists and artisans," DOST Assistant Secretary Raymund E. Liboro said during a recent visit to the facility.

To date, products displayed at MATIC come from locally based producers like Anthill Fabrics Gallery, Avatar Accessories, Tubigon Loom Weavers of Bohol, Cebu Interlace Weavers Corporation and Earthworks.

DOST provides assistance and support to other local industries with its array of programs and world-class facilities. Among these are the Food Innovation Centers for food processing, Advanced Device and Materials Testing and Laboratory or ADMATEL for the semiconductor industry and the Die and Mold Center for metal fabrication and engineering.

DOST Assistant Secretary Raymund E. Liboro (left) listens intently to European Chamber of Commerce of the Philippines Vice President for External Affairs Henry J. Schumacher as the latter explains how nanotechnology is being applied to create world-class standard products made of wood.

Al Rahman Farmers Multi-Purpose Cooperative Chair Modrika Masukat (second from left) introduces new hybrid rice varieties to (from left) DOST-Science and Technology Information Institute's Communication Resources and Production Division Chief Dr. Aristotle Carandang, DOST-ARMM Secretary Myra Mangkabung, DOST Region XI Director Dr. Anthony Sales, and DOST- Technology Application and Promotion Institute Director Engr. Edgar Garcia.

DOST-ARMM helps raise organic farming in Mamasapano

By ROMELIE JANELLE MARANAN, *DOST-STII*

Maguindanao has been striving to rise from the past as can be seen on the way it opens its door for new developments. The province is actually home to immense farmlands, a perfect place for agricultural innovation and a wealth of opportunities.

To help boost the production of farms in Maguindanao, the Department of Science and Technology- Autonomous Region in Muslim Mindanao (DOST-ARMM) is providing much-needed assistance to hundreds of farmers.

Among the beneficiaries of DOST-ARMM's support to farmers is the Al Rahman Farmers Multi-Purpose Cooperative. Just last year, the cooperative received the 1.2-million-peso Foliar Organic Fertilizer and Vermi Cast Production Project and the P555T Complementary Food Production Project from DOST- ARMM.

Located at Brgy. Manungkaling, Mamasapano, Maguindanao, Al Rahman

started its operation in 2000. It is engaged in organic farming of varieties of plants and covers 250 hectares of farmland. The cooperative now has 180 members.

The grant received by Al Rahman includes upgrading of facilities and equipment for Foliar Organic Fertilizer and Vermi Cast Processing. Said equipment include a shredder machine for vermin/composting, weighing scale, 50 units of vermincast beds, shaving machine/ screen, hanging air dryer, pressure tank water system, bag closer shredder machine for foliar organic fertilizer production, fermentation jar/ container, and mechanized mixer and sealer.

Assistance from DOST-ARMM also include product testing for standardization and product improvement, technology trainings and training on Good Manufacturing Practices (GMP) and packaging and labeling.

On the other hand, the Complementary Food Project includes provision of technologies for the rollout of complementary/ snack foods developed by the Food and Nutrition Research Institute (FNRI). The establishment of processing plant for complementary food thru the assistance is based on GMP and Quality Assurance standards which will be operated for institutional and commercial markets.

Al Rahman Chair Modrika A. Masukat assures that the coop's products are all organic, and that the coop promotes organic farming. The cooperative is also providing readily available organic fertilizer for the farmers in the province to help them restore the natural fertility of the soil and reduce farm production cost.

"All (of) the products of Al Rahman are Halal as they are into organic farming. The coop is in the process of Halal certification. They are under the One-Stop-Shop Product Development (of Tecknolohiyang Pangkabuhayan), and they are now in the stage of production. After that, we do the packaging and labeling, then the Halal certification," said DOST-ARMM Secretary Myra Mangkabung.

Apparently, production by the cooperative was temporarily stopped in the past months due to the Mamasapano incident in January 2015. But the operation has now resumed.

"Our main goal now is to produce more crops and help our farmers," said Masukat who just got back from hajj the day before the project visit at Al Rahman. After the acquisition of assistance from DOST-ARMM, Al Rahman earns around P200,000 per harvest of its organic rice.

As of now, the products of the coop are being sold in the local markets within the province of Maguindanao. The local government, on the other hand, buys the coop's products for feeding programs.

"We will show our fellow Filipinos that Maguindanao is not a violent place through these kinds of interventions. There are definitely lots of rooms for peace and innovation in our beautiful province," Sec. Mangkabung stated.

Modrika Masukat shows varieties of organic sesame and monggo seeds to project visitors at Al Rahman. (Photos by Gerardo G. Palad)

PHL manufacturing industry is in for a major facelift

By **JOY M. LAZCANO**, *DOST-STII*

The year 2013 has been very fruitful for the country as the world looks at the astonishing growth of the Philippine economy, moving up from 5.3 to 7.8 percent in the first quarter of 2013.

The country's GDP blossomed to 7.7 percent, mainly attributed to the steady performance of the local mining, manufacturing, and construction sectors, and surpassing that of Asian powerhouses led by China.

During the first quarter of 2013, the mining and quarrying industries posted a 17 percent gain, a windfall compared to the 1.7 and 2.8 percent gain during the first and last quarters of 2012.

The construction industry on the other hand, further increased its growth to 32.5 percent against a 29.9 percent posted in the last quarter of 2012.

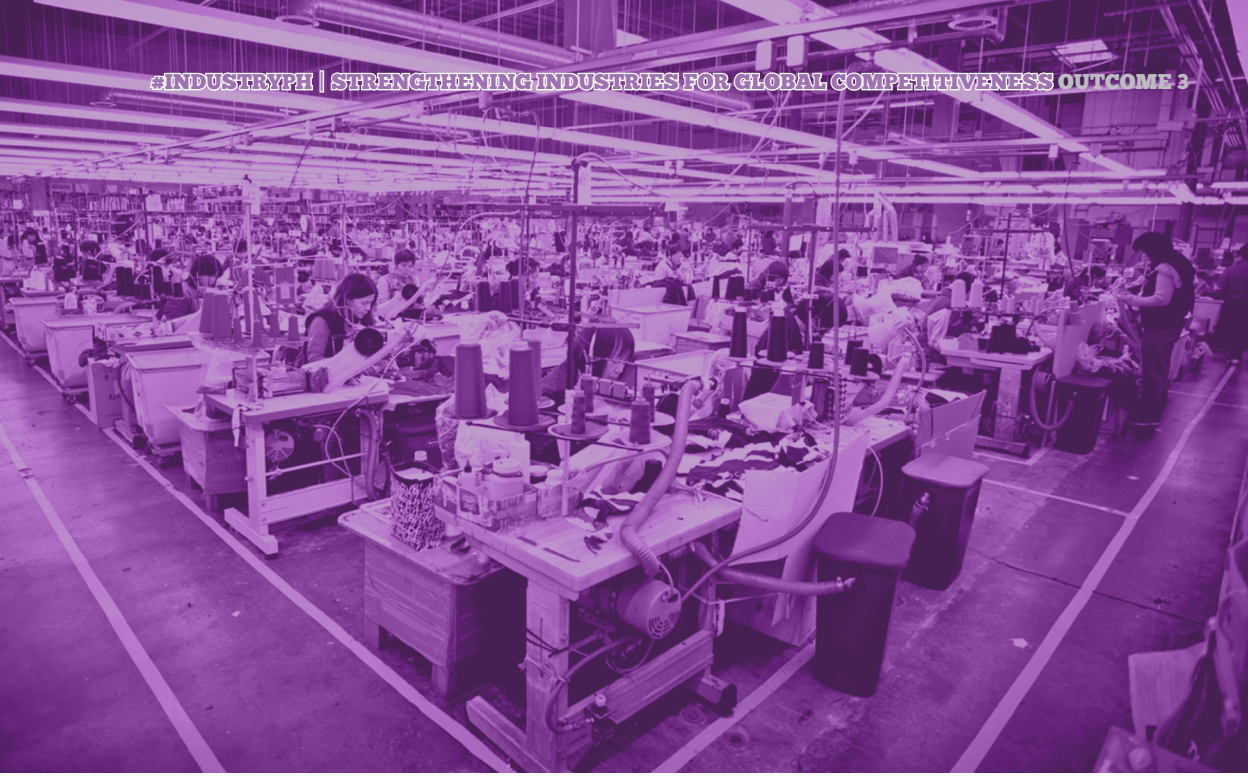
Meanwhile, manufacturing grew by 9.7 percent this year – higher from the 6 and 5.5 percent growth it recorded in the first and last quarters of 2012.

Despite these staggering figures trumpeted by local newspapers however, unemployment is still up by 6.5 percent in October 2013 while poverty rates remain high, with about a third of the population living on $2 a day.

For Mang Jimmy, a sole provider for a family of 10, these numbers do not make any sense. He said that the benefits of a strong economic performance were neither felt nor seen by his own naked eyes.

Pundits would rationalize this as the product of a weak manufacturing industry. Manufacturing is a more stable model for jobs generation.

Inspite of this sweet spot however, the manufacturing industry's performance is not enough to dramatically eclipse the economic deficits of the country. Add to this the fact that even the manufacturing industry itself



is plagued with various problems. These are problems associated with the industry's poor capabilities brought about by the government's previous policy which shifted its economy from manufacturing to what is now known as the service economy.

Also, the government made a few blind assessments by rationalizing that a good number of overseas Filipinos whose number is estimated at 2.2M during the period of April to September 2011, will provide the government with an estimated PhP156.3B in remittances according to a National Statistics Office survey in 2011.

It is not only the manufacturing industry which will get sidelined by a flawed economic planning; the country's supply chain will be affected as well. Potential investors are turned off by the lack of available raw materials which are basically important components of the industry aside from manpower and infrastructure.

The country has shed a huge part, if not all, of its resources to locally manufacture for domestic consumption and relied heavily on importations of some of its most basic products which have flooded the country's markets from Aparri to Jolo.

It was just recently that the government seemed to be rudely awakened by the clanging of tin cans from hungry mobs clamoring for food, shouting for work.

Recently, Socioeconomic Planning Secretary and National Economic and Development Authority Director-General Antonio Balisacan presented his side of the coin, pointing out that there is a need to "deepen the role of S&T in reviving the manufacturing sector."

In effect, the government is bent on reviving this beleaguered sector, pour out hefty resources and accelerate the development of emerging manufacturing subsectors.

The Department of Science and

Technology (DOST) was tasked to identify the sectors' needs in terms of equipment upgrades, training, locally available testing centers and research and development laboratories, to ensure top quality products and benefits to the local manufacturing firms.

To relay government's plans to revive the manufacturing industry, DOST made several dialogues with manufacturers from the metals and engineering as well as electronics and semiconductor sectors. Majority of manufacturing firms represented by their respective associations expressed their support to this initiative as it will help them optimize their productivity and eliminate their reliance on imported products.

Current overview of the manufacturing industry

The electronics and semiconductor industry is one of the country's major exports as it accounts for US$22.56B or 40% of the country's total exports for 2012. The industry began in the mid-'70s when multinational electronics firms relocated to developing countries due to escalating costs of production. The Philippines was the primary choice since it boasted a huge workforce of highly skilled and English-speaking people.

The government also offered very attractive investment packages in the form of tax holidays, duties, subsidies, and other tax and duties considerations for prospective foreign direct investors through its newly refurbished export processing zones and freeports.

The manufacturing industry consists of the following product categories: components and devices such as integrated circuits, transistors, diodes, resistors, coils, capacitors, transformers, lead frames, printed circuit boards; computer related products and Electronic Data Processing equipment which consists of personal computers, Hard Disk Drives, CD ROM, motherboards, software development, data encoding and conversion, systems integration customization; automotive electronics which includes Telematics – Global Positioning System, hybrid car and safety; consumer electronics such as flat panel TV, high definition TV, set top box, iPod, and digital cameras; office equipment such as photocopying machines and its parts, and electronics calculators; communications and radar including 3G handsets, TV reception on handsets, mobile services, and Radar; in telecommunications, products include telephones, scanners, satellite receivers, and cellular phones while control and instrumentation consist of products such as PCB Assembly for instrumentation equipment; and finally, medical and industrial products which consist of RFID, energy saving control, green electronics, and optical recognition devices.

Currently, the electronics and semiconductor sector is experiencing a slump due to global price cuts brought about by fierce competition. However, automotive and consumer electronics posted positive production growths in 2013, growing by 324% and 19.66% respectively. Meanwhile,

automotive exports were up by $362.75 million from $85.45 million in 2012, while consumer electronics generated $198.42 million, compared to $165.82 million in 2012.

Yet, the electronics and semiconductor sector accounted for a huge slice of the country's exports, according to the Nomura research in 2010. The industry is providing low-level services to the global electronics industry value chain by providing a mere assembly of electronics parts and components. At the same time, the industry is also one of the biggest importer of raw materials and other electronics components.

The total Philippine imports for the period of January to November 2010 according to the Bureau of Investments were registered at US$49.772 billion, 33.85 percent of which accounted for imports of electronic products valued at US$16.845 billion. Against the local exports, in 2010, the industry posted 61.18 percent, equivalent to US$31.079 billion.

DOST is now gearing toward attaining the US$50B mark in revenues for the sector in the next three years.

Another area of the manufacturing industry that needs attention is the metals and allied industries and engineering (M&E), which has a very small share in the local market. M&E consists of major metal allied sectors such as die and molds, metal casting, and machine works.

According to the Metals Industry Research and Development Center (DOST-MIRDC), in tools and die alone, a segment of the M&E, 39 percent of the local market is captured by plastics, 32 percent by pressworking/stamping, 18 percent by electronics, 10 percent by consumer electronics, 8 percent by rubber, 6 percent by diecasting, 3 percent by forging, and 1 percent by glassmaking. The die and molds subsector posted US$20M worth of estimated imports in 2010 while exports posted US$2M in 2003.

The metal casting sector, meanwhile, boasted of imports valued at US$489M in 2009 while exporti products totaled US$193M in the same year. The sector, composed of 195 small metal casting companies employing a workforce of 12,285 nationwide, has the lowest casting output in the ASEAN region.

Manufacturing infrastructure

In support of these industries, DOST has employed testing equipment and laboratories to help complement the needed upgrading of local capabilities in the industry. With state-of-the-art facilities and improved services, local industries will move up the value chain and attain global competitiveness.

One of these is the Advanced Device and Materials Testing Laboratory (ADMATEL), which was launched by DOST at the Industrial Technology Development Institute (DOST-ITDI) facility in Bicutan, Taguig City in early 2013.

The facility will conduct failure analysis tests and advanced materials characterization on several semiconductor components produced in the country thus reducing turnaround time and costs. According to

Semiconductor and Electronics Industry in the Philippines Inc. President Dan Lachica, local semiconductor firms spend around US$9 Million to US$18 Million annually for overseas testing alone.

ADMATEL houses cutting-edge equipment such as the Time-of-Flight Secondary Ion Mass Spectrometer which analyzes the composition of solid surfaces and thin films and determines the elemental, isotopic, or molecular composition of the surface to a depth of 1 to 2 nm. Another is the Auger Electron Spectrometer which analyzes the surface composition of a material. The Focused Ion Beam-Field Emission Scanning Electron Microscope is used to expose defects in the Integrated Circuit. Meanwhile, the Scanning Electron Microscope with Energy Dispersive X-ray, is a high-resolution imaging tool that can perform elemental analysis or chemical characterization of a sample.

Prior to its launch, ADMATEL was successfully used to analyze and determine the problem of a certain component chip of a branded smart phone. The testing lab will also help local semiconductor startups to conduct advanced research and development (R&D) activities.

Following ADMATEL's launch, DOST once again made headlines with the groundbreaking of another equally important laboratory, the Electronics Product Development Center (EPDC).

EPDC will provide a state-of-the-art design, prototyping, and testing facilities for Printed Circuit Boards (PCB), the primary electronics component that mechanically supports and electrically connects electronic components. Once operational in July 2014, the center will strengthen the electronics and semiconductor industry by enabling the local companies and the academe to conduct their own R&D activities, design, and prototyping of electronic components.

DOST and Electronics Industries Association of the Philippines, Inc. (EIAPI) President Alexander Sy believe in the EPDC's positive effects on the local electronics industry, enabling it to move up the value chain – from electronics assembly to the higher value services such as electronics design and manufacturing.

Eventually, the center will strengthen the local electronics design capabilities as many local firms will benefit tremendously. Sy explained that global electronics industry players get the biggest share of profits because of their design capabilities. He also pointed out that the country produces world-class engineers who are capable of designing local electronic components if given the proper support.

With the birth of the center, it is projected that design and manufacturing costs will be reduced to half. EIAPI stressed that companies are spending around US$5,000 to US$30,000 in design and prototyping alone. Moreover, with the local facility in place, shorter turnaround times in the product development cycle are expected as well as diminished risks of failing certification tests.

It will also draw more foreign investments

in the electronics industry which will eventually create technology spillovers similar to what China and Taiwan experienced in the last few decades.

What is more important is that more local firms will now be engaged in electronics R&D thus enabling them to manufacture electronic products.

DOST also gave its full support to the M&E industry through the Makinarya at Teknolohiya para sa Bayan Program or MAKIBAYAN, another program initiated by DOST to help develop local manufacturing machines.

Initial projects under the MAKIBAYAN program include the Innovation Center for Motor Vehicle and Parts Development where customized local road vehicles (CLRV) will undergo finite element analysis to determine their structural standards. CLRV consists of locally developed vehicles such as the Filipino icon "Jeepney," tricycles, and mini-buses.

Also on the drawing board is the Die and Mold Solution Center which will provide technical competencies in upgrading the die and mold industry.

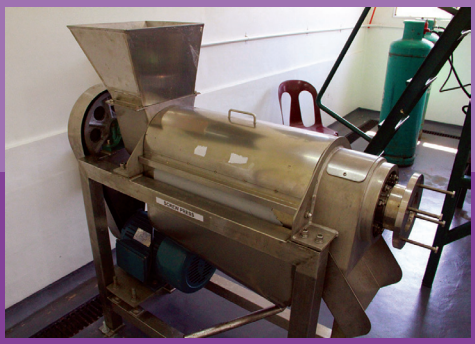
International assistance is also forthcoming for such initiatives.

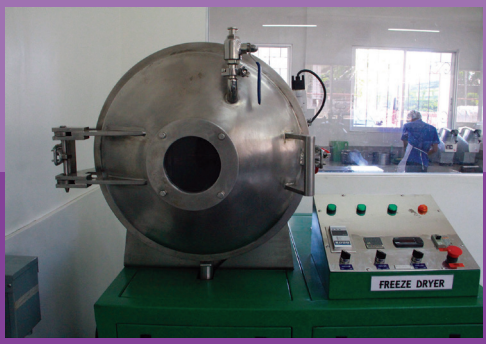
Presently, DOST is ironing talks with the United Nations Industrial Development Organization or UNIDO to bring in international support and cooperation in human capacity building and equipment upgrading of the country's manufacturing industry.

The International Center for the Advancement of Manufacturing Technology (ICAMT) program is also set to revitalize the M&E industry by bringing in international experts in various industries to improve local capabilities. The ICAMT initiative was warmly received by local industry players as this would speed up the knowledge transfer of various manufacturing sectors and enhance the productivity of neglected metals and allied industries. According to Metalworking Industry Association of the Philippines President Virgillio Lanzuela, DOST's partnership with ICAMT serves as an early Christmas gift to the M&E industry.

First Food Processing Innovation Center opens in Davao City

By **ESPIE ANGELICA A. DE LEON,** *DOST-STII*





Davao Food Innovation Center facilities

Department of Science and Technology (DOST) Region XI Director Dr. Anthony C. Sales signs the Pledge of Commitment during the launching of the Food Processing Innovation Center – the first facility of its kind in the country. The signing and recitation of the pledge was one of the highlights during the launching of the facility poised to catapult Davao's micro, small, and medium-based enterprises into world-class status.

The Department of Science and Technology (DOST) launched the first ever Food Processing Innovation Center in the country last May 15, 2014 at the Philippine Women's College (PWC) of Davao in Matina, Davao City. The launch formally ushered a more dynamic food industry whose gains will cascade down to micro, small, and medium-sized enterprises, especially for those based in the region.

The P5.3M facility is a joint undertaking among the DOST, PWC, Department of Trade and Industry, Food Processing Association of Davao, and the local government of Davao City.

According to DOST Region XI Director Dr. Anthony C. Sales, the facility "aims to produce value-added agricultural and fishery

food products by becoming the hub for innovations and technical support services for the food processing industry in Davao region."

Said support services include food testing, information, packaging and labeling design, consultancy services, trainings, and seminars. Through these services, the facility likewise aims to become a springboard for Davao's food processors to reach local and global standards in processing technology.

"Food processing contributes more than 40 percent of the Philippines' major manufacturing output," said DOST Undersecretary for Regional Operations Carol M. Yorobe during the launching attended by representatives of the partner agencies, stakeholders, and the media. Yorobe added that the establishment of a Food Processing Innovation Center in every region of the Philippines is part of DOST's S&T interventions for the food industry.

Housed within the PWC grounds at the heart of bustling Davao City, the center is GMP (Good Manufacturing Practices)-compliant and boasts of fabricated equipment by DOST's Industrial Technology Development Institute as part of the Department's High-Impact Technology Solutions program. These equipment hasten the production process and improve food and packaging quality in order to enhance product marketability and enable products to withstand transport.

Among these equipment are the vacuum fryer which allows frying of vegetables, root crops, mangoes, and jackfruit without eliminating their color and natural flavor; spray dryer which provides a faster and more efficient drying method and better control of powder quality; and the water retort which offers

retortable pouch packaging as a low-cost, environment-friendly, and more convenient alternative. Retort refers to the method of heat sterilization that frees food products from pathogens, making the food shelf stable.

The Food Processing Innovation Center is also equipped with a vacuum evaporator for coco honey, tomato paste and condensed milk; freeze dryer for meats, fruits, and vegetables; vacuum packaging machine ideal for foods stored and packed in retortable pouches like cereals, nuts, cured meat, chips, and the like; and the immersion freezer which ensures faster cooling process.

The launch was highlighted by the recitation of the Pledge of Commitment by officials and representatives of the partner agencies. "Effective technology application and deployment are possible with the partnership of government and the academe," Yorobe stressed.

Davao Region's pioneering Food Processing Innovation Center also serves as a common service facility for food technology students and professors.

Why choose gammay-ray column scanning over other techniques

- It gives real-time information
- It uses a sealed radioactive material that is not affected by environmental conditions, an advantage in troubleshooting procedures.
- It is non-destructive and cost efficient as there is no need for column preparation, removal of insulations and shutdown of operation during investigation
- It reduces production downtime.
- It does not emit or produce any waste to the environment, making it safe to use.

The advantages and benefits of gamma column scanning make it a favored procedure that is routinely used by competent industries in other countries to inspect and ensure the integrity and condition of their processes and vessels.

Gamma-ray scanning technology now available at DOST

By HANS JOSHUA DANTES, *DOST-PNRI*

The Department of Science and Technology - Philippine Nuclear Research Institute (PNRI) is offering its services using Gamma Ray Column Scanning Technology to assist the local industries, such as oil refineries and petrochemical plants, in the inspection and investigation of process vessels. This technology makes it possible to "see" inside a process vessel, such as distillation columns in refineries or petrochemical industries, and quickly identify its problems without interrupting normal plant operations. Such technique saves the client company time, money, and other resources.

Called density profile, the technique provides significant information on the condition of the whole process and the vessel itself. Engineers, using the technology, can identify damaged or missing trays and their positions, extent of flooding and its location, liquid weeping and foaming, liquid levels, and blockages, among others. Thus engineers and operators can determine the status of the column and consequently make arrangements for maintenance and troubleshooting to prevent emergency shutdown.

Since the process does not involve direct contact with the insides of the vessels, it also avoids potential corrosion, temperature or pressure problems.

This precision nuclear tool could prove useful beyond troubleshooting structural problems. The data gathered may also be used to improve the structures and processes of the plant, thus making them more efficient and reducing production down-time in cases of programmed shutdowns.

Meanwhile, process columns are crucial components in refining crude oil to turn it into valuable fuel, as well as in sustaining the plant's cooling systems, among others. Plant shutdowns for maintenance could cost around $1,200 per hour overseas, translating into millions of pesos in losses everyday for the local operators.

Prospective clients of the gamma-ray column scanning service range from members of the oil industry to operators of chemical plants.

Since the late 1990s, PNRI experts have provided gamma-ray services to major oil companies with local operations in the Central and Southern Luzon and local petrochemical companies. The Department of Science and Technology Grants-in-Aid project also kept the service and equipment upgraded with automated data-logging software and scanning systems.

For more information on gamma column scanning, please contact Section Head Adelina Bulos of the PNRI Isotope Techniques Section in Commonwealth Avenue, Diliman, Quezon City or call us at 929-6011 local 225 or 240. You can also send your queries at isotopetechnques@pnri.dost.gov.ph

Metals industry gets additional boost from DOST

By **JOY M. LAZCANO,** *DOST-STII*

The Philippine metals and manufacturing industry will now get a much-needed push toward global competitiveness as the Department of Science and Technology (DOST) launches the Die and Mold Solution Center (DMSC) – a one-stop solution for die and mold design and fabrication - during the opening of the 4th Metals and Engineering Week last June 16, 2014.

Housed within DOST's Metals Industry Research and Development Center in Bicutan, Taguig City, the DMSC is a project under the Department's Makinarya at Teknolohiya Para sa Bayan or MakiBayan, a program for empowering the local manufacturing industry by providing locally designed and developed manufacturing equipment and tools.

"State-of-the-art equipment, we have that. Competent personnel, we have that as well," emphasized DOST Secretary Mario G. Montejo as he described the newly launched facility and its relevance to local manufacturing.

DIE AND MOLD SOLUTION CENTER LAUNCHED. DOST Secretary Mario G. Montejo (middle) checks out the brand new, state-of-the-art machine for die making during the launching of the Die and Mold Solution Center held at the Metals Industry Research and Development Center in Bicutan, Taguig City. The DMSC is a one-stop center for die and mold fabrication, allowing for a shorter production turnaround time at a relatively lower cost, thus avoiding the previous costly practice of sending die and mold designs overseas for fabrication. The center hopes to create a significant impact on the local metals and allied industries as well as in the manufacturing sector. Also in photo are DOST Assistant Secretary Robert Dizon (left) and DMSC Project Leader Engr. Fred Liza. (Photo by Gerardo Palad, S&T Media Service, DOST-STII)

Department of Trade and Industry (DTI) Secretary Gregory Domingo stressed that the launching of DMSC will translate to shorter turnaround times, greater savings and a more cost-efficient production process.

Die and mold fabrication is a key element of the manufacturing industry. Locally, it also presents a major capability gap. Previous industry practice involved local players sending their die and mold designs abroad for fabrication. Such service was not available in the Philippines, making it more costly for manufacturers and translating to lengthier production timelines. This gap has marred the growth of the metals and allied industries in the country.

Sec. Domingo suggested the replication of the DMSC in various other parts of the country such as Northern Luzon, Cebu, and Mindanao to allow industry players in these parts to gain access to quality fabrication services and further promote the growth and competitiveness of the local metals and allied sectors.

Towards a greener environment ITDI develops abaca composites for Tryk ni Juan

By **VIOLY B. CONOZA,** *DOST-ITDI*
With reports from C Emolaga & Delia Delica Gotis

Taguig City Mayor Hon. Lani Cayetano and DOST Secretary Fortunato T. de la Peña ride on DOST-ITDI's Tryk ni Juan with its abaca-made roofing and sidecar.

Tryk ni Juan is the latest venture of the DOST-ITDI (Industrial Technology Development Institute) in promoting the use of green composite materials from locally abundant natural fibers like abaca for automotive applications to help make a greener environment.

Focusing on the green attributes of abaca fiber, materials science experts from the DOST-Industrial Technology Development Institute (ITDI) developed the abaca fiber-reinforced composite to fabricate the roof and sidecar of the common tricycle.

Experts combined abaca fibers and resin to form the composites as materials to the roof and sidecar which are now branded as Tryk ni Juan.

"The project which started in 2010 is a collaborative research between the ITDI and Korea Institute of Materials Science (KIMS) – Association of Southeast Asian Nation that aims to increase cooperation between the parties in the field of materials science and develop abaca fiber-reinforced composites for industrial application," said Dr. Marissa Paglicawan, project leader, supervising science research specialist of ITDI's Materials Science Division.

The DOST-ITDI - developed composite material is a good substitute material for metals like stainless steel, galvanized iron, and other materials commonly used to make tricycle roofs and sidecars, and some automotive parts/components.

The ITDI and KIMS researchers explored the use of different abaca treatments, surface modification techniques, and composite production technologies (e.g., vacuum-assisted resin transfer molding) for natural fiber reinforced-composite production.

In June 2015, the ITDI, Gnostek Inc., and the General Santos Street Lower/Upper Bicutan Taguig Tricycle Operators-Drivers Association, Inc. (GSS-LUBTTODAI) signed a memorandum of agreement assigning the Gnostek Inc. as the fabricator of the abaca fiber-reinforced composite for tricycle driver's roofs; and the GSS-LUBTTODA members as

Prototype products

the recipients/participants in the performance/ field-tests.

As agreed upon by the parties, 15 prototypes were fabricated and installed on participating tricycle units and deployed for actual road test/use this year.

The collaborative project capitalizes on the abundance of locally available natural fibers like abaca in addressing the need for new reinforcing materials that are both cheap and environment-friendly. Abaca fiber (known as Manila hemp) is endemic in the Philippines and is considered as one of the strongest natural fibers. It is also far more resistant to salt water decomposition than most of the vegetable fibers

Over the last few years, the negative impacts of climate change had been increasingly being felt so that environmental awareness among our people had also been steadily mounting. These also led to the development of new and alternative materials and natural fiber- reinforced composite materials are among them.

Paglicawan further explained, "Composite materials are made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components but acting in harmony suitable for structural applications. Now we used the abaca fiber as reinforcement material to promote the philosophy of green composites and increase the share of natural fiber composites in automobiles as well as structural parts in other industries."

Master mold preparation

Because fibers are stronger and stiffer, fiber reinforcement has shown to be very effective. And currently, more industries are investing on environment-friendly, sustainable materials such as natural fiber - reinforced composite materials such that these are now considered an important class of materials. The properties of the composite can also be tailor-made depending on the specific purpose, making it even more desirable.

Abaca is a locally abundant natural fiber. It is lightweight and a renewable, sustainable raw material. The Philippines is the world's leading abaca producer producing around 50,000–57,000 tons per annum. It is mainly used in industrial cordage, handicrafts, fashion products such as hats and accessories, home and house ware and decorative products.

In recent years, abaca has shown promise as an energy-saving replacement for glass fibers in automobiles. For one, Mercedes Benz is known to have used abaca fiber - reinforced polypropylene composites in automobile body parts while Daimler Chrysler used them in under floor protection of passenger cars.

Literature also says that in 2011, Girones et al., claimed that "the use of abaca fiber instead of glass fiber reduces the weight of automotive parts, bringing about 60% savings in energy and reduces CO2 emissions." These green attributes thus help build a healthy ecosystem while reducing production costs.

While adding value to abaca, this innovation also provides opportunities to explore and maximize the use of other locally abundant natural fibers for composite fabrication that may yet revitalize the local natural fiber industry.

Increased demand for abaca fiber composites can also provide employment opportunities and improve the income of abaca fiber producers. This may also lead to further exploring and maximizing the many other uses or applications of abaca and other local natural fibers.

For inquiries, please contact Dr. Blessie A. Basilia, Chief, Materials Science Division (MSD); Tel. (632) 837.2071 to 82 local 2201 or email: msd@itdi.dost.gov.ph.

Prototype carbonizer (painted red) is shown in foreground. Behind it is the gasification component (fluidized bed gasifier). (Photo by RBSMCI1)

The fluidized bed gasifier up close. (Photo by RBSMCI1)

Sugar company gets DOST support for renewable energy facility

Raw Brown Sugar Milling Company from Negros Oriental, through a P990,000 equipment grant from DOST, now has renewable energy facility—the first in the country-- to enhance its muscovado production.

A sugar company finally built a facility that converts wastes to new source of renewable energy, the first of its kind in the country. Called Fluidized Bed Gasification (FBG) System, the facility was recently unveiled by the Raw Brown Sugar Milling Company, Inc. in Pamplona, Negros Oriental.

The FBG System, introduced by the Department of Science and Technology-Industrial Technology Development Institute (DOST-ITDI), is used by manufacturing plants to convert biomass into new source of renewable energy.

Agri wastes are "burned" when a limited amount of oxygen or air is introduced into the FBG System to produce carbon dioxide and energy. This drives a second reaction that further converts waste material to hydrogen and additional carbon dioxide-- this is the gasification stage.

As such, the system helps supply the electric power requirement and bring down electricity costs of the company, according to Atty. Alejandro Florian O. Alcantara, president and CEO of the company.

"I see several advantages to powering our turbines with synthetic gas produced by ITDI's FBG System. These are 100 percent reduction of our agricultural wastes, production of our monthly electricity requirement at no cost, and significant reduction of gaseous pollutants due to the near-zero combustion process of the FBG System," Atty. Alcantara said.

The system is expected to provide around 40 percent of the company's total electricity requirement. The plant produces nearly 1,100 tons of pure, whole and unrefined muscovado annually. Muscovado is produced from fresh sugarcane juice without using bleaching agents.

DOST-ITDI's Engr. Apollo Victor Bawagan said that the gasification of biomass, such as sugarcane bagasse and sugarcane trash, is "most interesting" because the produced synthetic gas has a near-zero combustion. Bawagan led the DOST-ITDI team that modified the biomass carbonizer technology for sugarcan bagasse to support the setting up of the a co-generation facility atthe plant.

The DOST Region VII through the Negros Oriental Provincial Science and Technology Center provided P990,000 for this Grants-In-Aids project. Components include among others the design, fabrication and installation, testing and debuggingof the 50kg/hr batch-type biomass carbonizer.

The launching ceremony was attended by DOST VII Regional Director Edilberto L. Paradela, Bawagan, and the company's business associate,Edward Lee. Various government agencies, private sectors and local businessmen also witnessedthe event.

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