Amidst Challenging Times

MIRDC
2020 ANNUAL REPORT

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MESSAGE from the SECRETARY

Given the chance to be part of the solution to a problem, our general reaction is to grab that chance without hesitation. That is how we are as Filipinos. That is how we are as human beings.

The pandemic that came in 2020 is a clear example of this opportunity to be a solution-finder. I am glad that despite the risks, the employees of the DOST-Metals Industry Research and Development Center still proactively heeded and responded to the nation's cry for help.

Self-preservation is an instinct, especially during the most uncertain times at the onset of the pandemic. But as public servants, we carry on our shoulders the responsibility to serve - no matter what. The Center was there to contribute all it can so that it was still 'service as usual.'

I commend the DOST-MIRDC for all the initiatives focused on addressing the country's needs through innovative use of science and technology, and through creative ways of embarking on projects whose outputs are for the benefit of frontliners.

The battle is far from over. Looking at how dedicated and determined the DOST-MIRDC is in giving relevant service to the industry and to the country in general, I see that we all play a very crucial role: we represent hope; we are a helping hand; and we show our fellow Filipinos how it is to not give up.

For the sacrifice, the hard work, and for being there as dependable public servants, thank you, DOST-MIRDC

FORTUNATO T. DELA PEÑA
Secretary, DOST
and Chairperson, MIRDC
Governing Council

MESSAGE from the EXECUTIVE DIRECTOR

In all the years of operations of the Department of Science and Technology-Metals Industry Research and Development Center, our focus has been, first and foremost, to serve the local metals, engineering, and allied industries. Every year is quite different, marked with unique highlights that make each year special and fulfilling for all of us.

The year 2020 is different and unforgettable in many aspects.

The pandemic continues to change lives. But we remained committed to our mission of serving the metals, engineering, and allied industries. It is during these panic and distress-filled times that we also had the opportunity to utilized science, technology, and innovation to serve our valued frontliners.

On behalf of the DOST-MIRDC, I am proud to present to you the 2020 Annual Report.

All these accomplishments have become more meaningful with the strong leadership of the DOST, the support of our dependable industry partners and generous donors, and the hard work of all the motivated men and women that make up the DOST-MIRDC family.

We rose above the challenges. Backed up by science, technology, and innovation, motivated with the desire to serve, and guided by faith, I believe we will continue to rise above many more challenges to come.

ROBERT O. DIZON
Executive Director, MIRDC

MIRDC

VISION

Center of excellence in science, technology and innovation for a globally-competitive metals, engineering and allied industries by 2025.

MISSION

We are committed to provide both government and private sectors in the metals, engineering and allied industries with professional management and technical expertise on the training of engineers and technicians; information exchange; quality control and testing; research and development; technology transfer; and business economics and advisory services.

QUALITY, ENVIRONMENTAL, and INFORMATION SECURITY POLICY

We are committed to provide products and services to both the government and the private sectors in the metals and engineering and allied industries with the highest standards of quality and reliability within our capabilities and resources and aligned to our strategic direction, to comply with applicable statutory and regulatory requirements to plan and implement actions to address risks and opportunities and to continually improve the effectiveness of our Quality, Environmental and Information Security Management Systems in order to enhance customer satisfaction at all times.

We shall manage and control our activities in order to minimize adverse impacts on the environment, prevent pollution and safeguard the health and safety of all employees, stakeholders, customers, external providers, and the surrounding community.

CORE VALUES

PROFESSIONALISM

- We adhere to the highest ethical standards of performance.
- We value our work and are committed to perform to the best of our ability.

RESPONSIVENESS

- We spearhead implementation of projects that address the needs of the metals and engineering industries.
- We find solutions to real-life problems through science, technology, and innovation.

INTEGRITY

- We act responsibly, work honestly, and encourage transparency.

DYNAMISM

- We perform our jobs with vigor and enthusiasm.
- We welcome change as an opportunity for growth and continual improvement.

EXCELLENCE

- We adhere to world-class performance and continuous improvement in all we do.
- We always do our best in every task/endeavor.

I. We Heal as One: Joining National Efforts to Battle Covid-19

(Projects and activities implemented as a response to the pandemic)

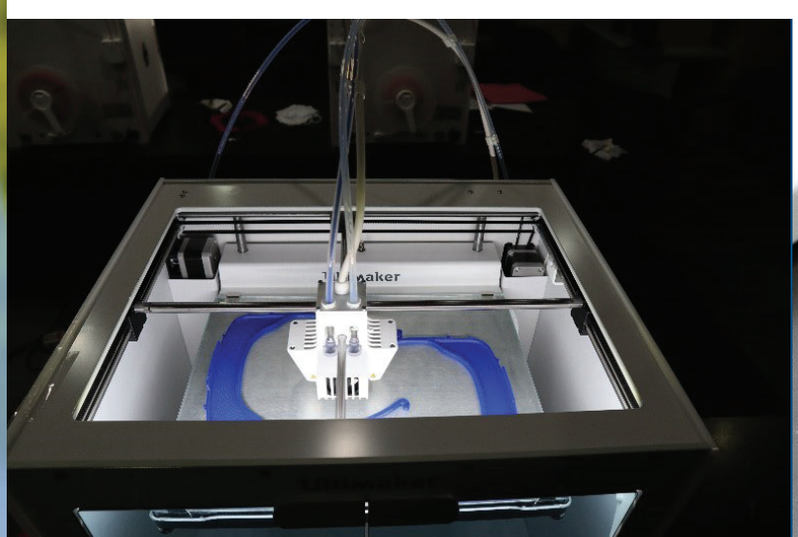
'In the middle of difficulty lies opportunity.'
- Albert Einstein

This year has been tough.

But as public servants, the Department of Science and Technology-Metals Industry and Research Development Center, made up of all its divisions, sections, and units, stood up to the challenge of the Covid-19 pandemic to contribute to the efforts of a nation in battle for the welfare and safety of its people.

A. Stopgap: Production of Face Shields via 3D Printing Technology

In response to the COVID-19 pandemic, the DOST-MIRDC, through the Materials and Process Research Division, specifically the Advanced Manufacturing Center (AMCen) project team, joined the 3D Printing for a Cause PH in the effort of producing face shields to help protect the frontliners. The design used in producing the face shields was from 3D Printing for a Cause PH. The shield frames were produced via fused deposition modelling (FDM), and the face shield is easily assembled using acetate sheets. The materials used for the face shield frames were polylactic acid (PLA) and acrylonitrile butadiene styrene (ABS), with a total printing time of 1.53 h for each set of two units. The nozzle (build plate) temperature was set to 210^{0}C (60^{0}C) for the PLA and 250^{0}C (85^{0}C) for the ABS. The 3D printing run produced 490 face shields. The recipients were the Philippine General Hospital, Army Hospital, Taguig Traffic Management Office, DOST security personnel, and DOST personnel. The face shields were sanitized before distribution.



3D Printing of Face Shield Frame

Assembled Face Shield

Delivery to Philippine General Hospital

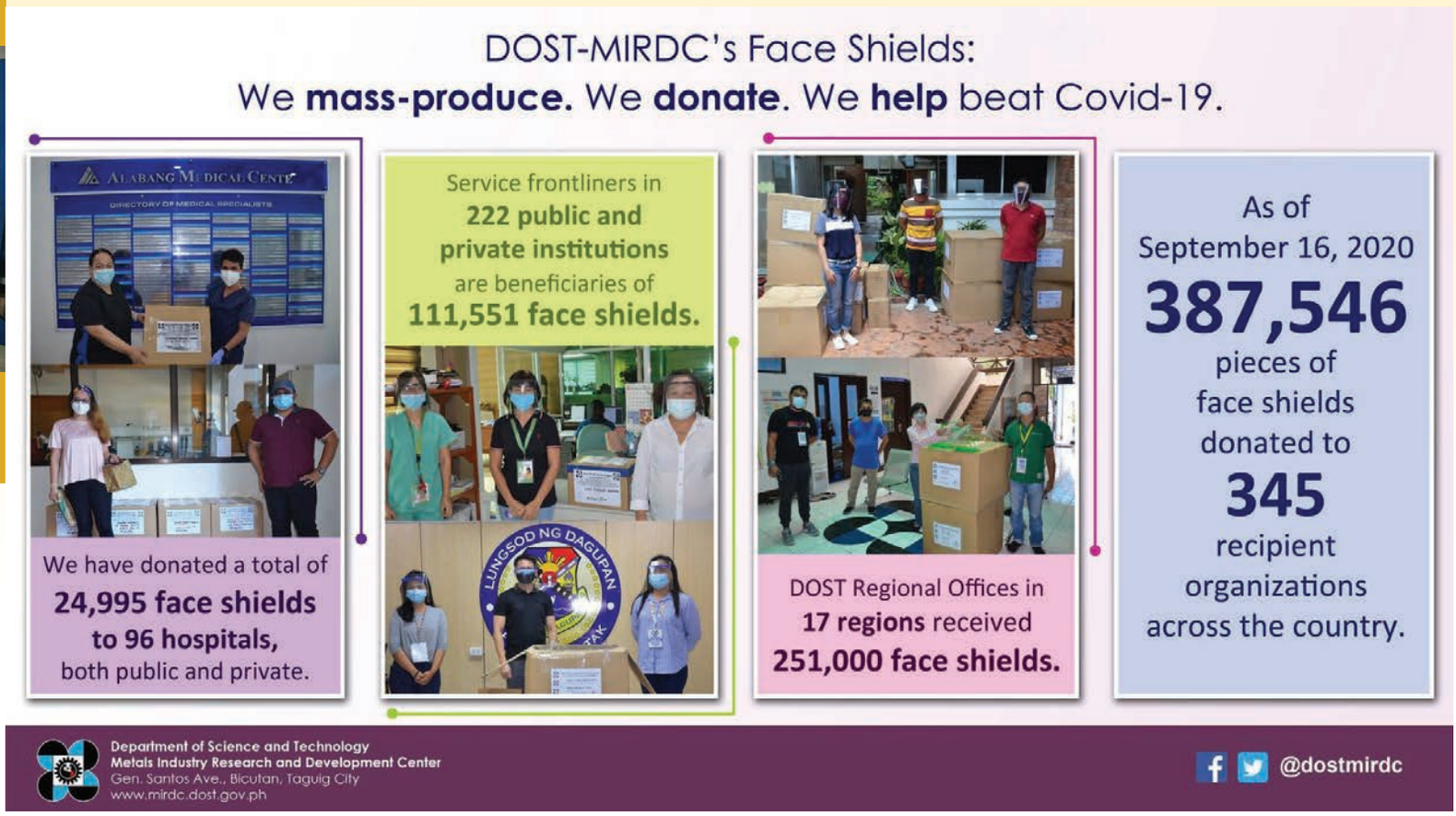
Distribution to Taguig Traffic Management Personnel

Distribution to Army Hospital Personnel

B. Mass Production of Face Shields using the Plastic Injection Molding Technology

During the lockdown, the Center also mobilized the technical people (designer and machine operators) under the Technical Solutions Services Section (TSSS), and came up with a design of a face shield that can help protect the health workers and frontliners. A project then was formulated to produce face shields for the front liners.

TSSS frontliners headed by Mr. Edilbert M. Dela Pena, along with Designer Rommel G. Adame and dedicated engineers and technicians involved during the production and delivery of more than 300,000 pieces of face shields for health workers in various places in the country.



B.1. Face Shield for the People in the Frontline Project

The DOST-MIRDC responded to the call of the 'Bayanihan to Heal as One Act' in beating the Covid-19 pandemic in the country. At the onset of the Enhanced Community Quarantine (ECQ), the Center engaged in the production of face shields for donation to medical and service frontliners in Metro Manila. However, as the community quarantine period was repeatedly extended, the Center shifted from 3D printing to plastic mold injection to address the mass production requirements of face shields so that there will be face shields, not just for the frontliners nearby, but for more beneficiaries in the regions as well.

The TSSS and the Technology Diffusion Division (TDD) personnel were involved in the production and distribution of the face shield. The project was eventually concluded on August 14, 2020. There were a total of 387,546 face shields donated as of September 16, 2020, that reached a total of 345 institutions all over the country: 96 hospitals and health centers; 222 service frontliners, including the partner organizations and local government units; and 17 Department of Science and Technology Regional Offices (DOST ROs).

C. Research and Development Project at the Height of the Pandemic

The pandemic did not hinder our team to fulfill our duties and responsibilities, but rather, tested our skills and capabilities to come up with new and much relevant technologies that will benefit the many.

The Prototyping Divison (PD) team embarked on the development of an adult ventilator.

Development of a Prototype Adult Pressure Controlled Ventilator using the OstreaVent™ Technology

This project is the highlight of the PD's initiatives during the pandemic. The team was headed by DOST-MIRDC's Executive Director Robert O. Dizon. The team is composed of Isidro D. Millo, Franz Joseph D. Libao, Glen D. Espena, Godfreyson L. Nardo, and Robin M. Costales.

Figure 1. OstreaVentTM Ventilator

Ventilators are machines that provide life support for patients who have difficulty breathing or who have lost all ability to breathe on their own. Severe cases of COVID-19 and other respiratory ailments impair normal lung function that makes breathing hard for patients. Thus, such machines are used to aid patients admitted in intensive or critical care units.

The surge of patients diagnosed with COVID-19 throughout the country highlighted the increased need for ventilators for severe cases of COVID-19 patients.

To help address this requirement, the Center partnered with the Breath of Life Foundation for the development of the OstreaVent II prototype. It was based on an existing ventilator (OstreaVent I) that was originally developed for infants. It was retrofitted to be used by adult patients. Additional features were also integrated to enhance its capabilities.

The Ostreavent II was subjected to several testing procedures to determine its capacity and limitations. Test results showed that the prototype delivers the required volume and pressure of air needed for adult patients. Tidal volume and pressure measurements are within the acceptable range. Alarms and indicators are also sufficient for the clinician's or medical personnel's requirements.

II. Keeping It Steady: Uncompromising Service to the Metals, Engineering, and Allied Industries

(Accomplishments based on 2020 targets)

'I can't change the direction of the wind, but I can adjust my sails to always reach my destination.'

- Jimmy Dean

Despite the setbacks caused by the Covid19 pandemic, the Planning and Management Division (PMD) remained committed to its functions, including the effective evaluation and monitoring of the Center's targets and accomplishments.

2020 Agency Performance Report by Program Expense Classification (PREXC)

The PMD regularly monitors the physical and financial accomplishments of the Center vis-à-vis the Key Performance Indicators (KPIs) indicated on the Program Expense Classification (PREXC) of the Department of Budget and Management (DBM) as part of the implementation of mandate-based programs and sub-programs as a strategy for performance-informed budgeting.

Targets for the PREXC KPIs were reassessed during the MidYear Planning and Review (MYRP). Revisions were made to consider the impact of the lockdown and quarantine caused by the COVID-19 pandemic. In terms of physical performance, the Center had accomplished the full-year original targets for nine (9) out of its thirteen (13) PREXC KPIs as well as eleven (11) of 13 KPIs based from revised targets.

A. Metals Industry Research Program

Budget: PhP 92,870 million or 37% of the total allotment

The Metals Industry Research Program of the DOST-MIRDC is comprised of programs/projects/activities that are focused on four (4) major programs namely: 1) Defense and Security Interventions through R&D (DESIRED) Program; 2) Materials and Minerals Processing Program; 3) Machine Building Program; and; 4) Advanced Transport Program. These are R&D programs envisioned to strategically provide reliable and long-term S&T solutions to the industries' rapidly changing issues and challenges. The Center's accomplishments with regard to these programs are as follows:

• A total of 29 partnerships were forged in 2020 with counterpart resources generated out of these partnerships reaching Php 2,011,015.00. Eight (8) new MOU/MOA/PPP/CRA were forged with private stakeholders and with other government agencies outside of DOST. As to the 21 maintained partnerships, majority are linkages or collaborations with partner industry associations of the Center.

• There were eight (8) R&D projects completed, one (1) of which is a Grants-in-Aid project funded by the DOST; four (4) are contract research projects; and three (3) are joint research projects with private companies. Further, 70% of the 10 new and on-going R&D projects were implemented on time. Projects implemented within the approved timeframe refer to projects whose overall project duration is officially approved by the EXECOM/Governing Board/Approving Authority.

• In the last five (5) years, 29 of 192 completed R&D projects were presented as scientific papers in national and international conferences, published in peer-reviewed journals, filed and granted intellectual property rights by the Intellectual Property Office. Most of the remaining R&D projects were adopted by the Center's contract research partners.

Prototype Development of FAME Transponder Casing for Maritime Use

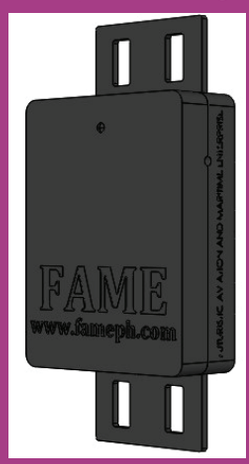
Project Duration: July – December 2020
Project Leader: Joseph Alfred V. Garcia
Partner: Futuristic Aviation and Maritime Enterprise, Inc. (FAME)

Futuristic Aviation and Maritime Enterprise, Inc. (FAME) is a startup providing communication and monitoring solutions for the fishing and flight industry. The startup decided to partner with DOST's AMCen for rapid prototyping of their transponder casing for fishing vessels. The AMCen team worked to develop FAME's design requirements, using polycarbonate (PC) material through FDM printing. The material, PC, allows transmission of RF and LIDAR, and has high thermal and UV resistance properties. Moreover, the material is compatible for injection molding. Twenty casings were produced at the end of the project and were tested by the AMCen team following IEC 60529 (Ingress Protection Testing). The developed transponder casing was also applied by FAME for BFAR accreditation. The 3D printed casing has passed the accreditation and is currently being deployed by FAME in their business.

AMCen and FAME conducting water leak test

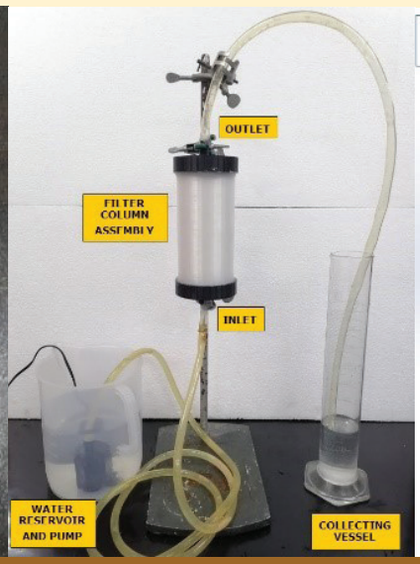
3D Model of FAME Transponder Casing

3D printed Transponder Casing

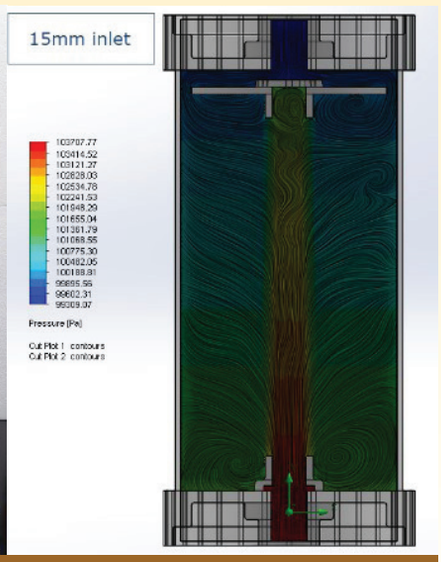


Actual transponder system being used by General Santos City's fishermen

3D printed Column Filter Enclosure



Test setup of Column Filter



CFD Simulation of Enclosure

AMCen and PNRI setting up the column filter for testing

Prototype Development of Column for Radiation-Grafted Adsorbents for Wastewater

Project Duration: July 2020 – April 2021
Project Leader: Alvin M. Buison
Partner: Philippine Nuclear Research Institute (DOST-PNRI)

The DOST-PNRI is currently developing a technology that aims to mitigate water contamination brought about by large manufacturing industries in the country. To address this, the DOST-PNRI embarked on the development of a filter that selectively reacts with chrome ions by adsorption. In the past years that they have been developing this filtering systems, the testing set-up made available to them became their limitation. The DOST-PNRI project team needed to come up with a way to enclose the filter so that they can study the efficiency of the filter fabric they were developing. This enclosure is referred to as a 'column.'

The DOST-PNRI sought collaboration with the DOST-MIRDC's AMCen team to develop a custom filter that will allow them flexibility to control the flow of the wastewater and achieve the most optimal configurations for their testing. The designated AMCen project team was able to develop and supply DOST-PNRI with two sets of functional prototypes of filter columns for their ongoing research. The prototypes were functionally tested by the DOST-PNRI team. The developed filter column achieved the target flow rate of not less than 150L/hr and has a leak-tight design. With the success of the project, DOST-PNRI has expressed interest in collaborating in larger scale wastewater treatment systems hand in hand with the filter technology they are developing.

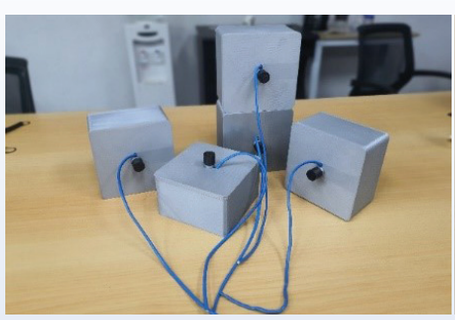
Development of Conical Plastic Container and Packaging Box for the Improvised Explosive Device (IED) Disruptor

Project Duration: December 2020 – March 2021
Project Leader: Denise Daryl A. Florante
Partner: Research Development Center
Army Support Command
Philippine Army

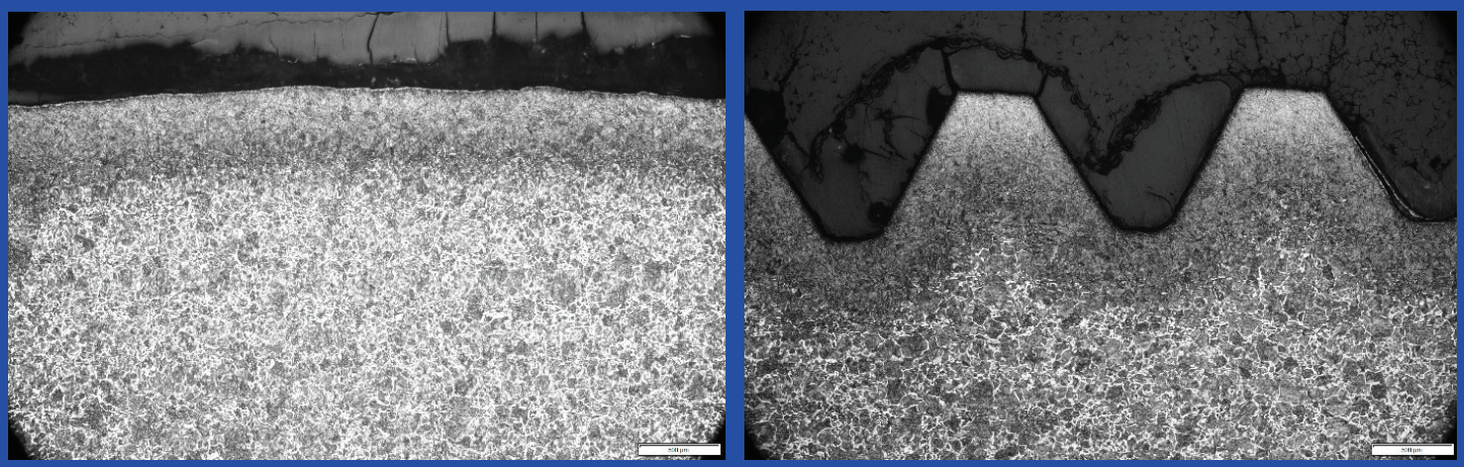
In line with the Modernization Program of the Philippine Army which states that, "all military items will be standardized," the PA sought the help of DOST-MIRDC to develop a conical plastic container and packaging box for the IED Disruptor using additive manufacturing (AM) or 3D printing technology. The existing IED disruptor used by the EOD of the Philippine Army uses only available household materials that are not of military-grade and with low durability. The developed IED disruptor printed using (PLA) and (ABS) improves the appearance, consistency of design, and fabrication process.

The developed IED disruptor has a provision of grooves in the conical plastic container that serves as a guide in the detonating cord's winding, unlike with the previous, which uses a plastic funnel, which complicates the process due to its smooth surface. For its packaging box, an adjustable stand was incorporated into the design for uneven terrains. The developed IED disruptor underwent the explosive disruptive field test at Unknown Distance Range (URD), Brgy, Lawy, Capas, Tarlac together with RDC, ASCOM, PA, and EOD Battalion. The developed IED disruptor performed well in disarming the sample IED. The project helped the Philippine Army to have a standard design and specifications for an IED disruptor. The EOD Battalion would use the developed disruptor to contain/detonate an IED from a distance and ensure the safety of our soldiers.

(L) AMCen and PA inspecting the blast site post testing (R) Improvised IED Disruptor



3D printed IED Disruptor Enclosure and Box



Photomicrographs of shank (left) and thread (right) sections of bolt showing vacuum carburized layer.

A Comparative Study on the Metallographic Structure of Low Carbon Steel Bolts Case-Hardened Using Vacuum Carburizing Heat Treatment for Rice Thresher Application

Project Duration: September 2019 - December 2020
Project Leader: Joey G. Pangilinan
Partner: ATON Marketing

The objective of this project is to extend the service life of threaded bolts used as pegs in rice threshers. The process of carburizing was used to increase the surface hardness, which will then improve the wear and abrasion resistance of the bolts.

With the extended service life of the bolts, the downtime of machines and other related maintenance costs due to replacement of worn-out bolts will be reduced. In effect, the productivity of the local industry will increase.

The DOST-MIRDC utilizes two types of carburizing process; the conventional Pack Carburizing and the more sophisticated Vacuum Carburizing. Since this Vacuum Carburizing furnace is relatively new, the DOST-MIRDC is still developing and building its expertise on this technology. Bolts were carburized using both types of processes and were compared for metallurgical and mechanical properties.

Forming Die (top) and Blanking Die (bottom)

Aton Marketing's SS impeller blade (left) and SS impeller blade produced using the alternative process (right)

Development of Alternative Manufacturing Process for the Production of SS Impeller Blade for Small Fishing Boat: Blanking Die, and Forming Die

Project Duration: July 2018 – October 2020
Project Leader: Isidro D. Millo
Partner: ATON Marketing

The DOST-MIRDC, in partnership with ATON Marketing, engaged with the project that focused on the development of blanking and forming die as an alternative process in the production of stainless steel (SS) impeller blades attached to a power press. This project was completed by Engr. Raymond De Ocampo, Engr. Ronie S. Alamon, and Engr. Joein L. Luces headed by Engr. Isidro D. Millo.

The SS impeller blade was assembled and aligned using the designed welding jig. The finished product is smooth and showed no burr and sharp edges. The dies attached to the automatic power press provided ease of operation to the worker. The use of dies and fixtures proved to be an alternative manufacturing process for the production of the SS impeller blades for small fishing boats. This was evident in terms of processing time and quality of the impeller blade produced. The processing time for 10 pieces of SS Impeller Blade took only 3260 sec. (54.33 min) as compared to the current method used by ATON Marketing that takes 10 hours to produce 10 pieces of impeller blades.

Design Improvement of RU'S Sugarcane Juicer

Project Duration: August 2019 – January 2020
Project Leader: Jose B. Ferrer
Partner: RU Foundry and Machine Shop Corp.

The project was made Through the partnership with the RU Foundry and Machine Shop Corp. This was completed by Engr. Jose B. Ferrer and Dr. Dominic Guevarra.

This project focused on the reconstruction, improvement, and testing of the small-scale sugarcane juice extracting machine, which is comprised of three (3) crushing rollers. Consideration was given to the techno-economic status of the small and medium-scale sugarcane juice processors who are the intended users of the machine particularly for muscovado sugar production.

The R&D focused on the improvement in the design, structure, and optimization of the crushing roller assembly: strengthening through the fastening of the crushing rollers to the shafts; provision of adjustment on the crushing gap between rollers; and improvement of the pairing and adjustment of the scraper with the serrations on the crushing roller. All these are expected to improve the juice yield and crushing capacity of the machine.

Based on the test results, the improvements and modifications carried out on the machine were successfully demonstrated. The machine performed satisfactorily with the gap between the discharge and top rollers set at about 0.6 mm, and the gap between the feeding and top rollers was about 10.5 mm. Further, the machine can crush four sugar cane stalks with diameter ranging from 16 to 32 mm at the same time without risking the integrity of the motor. The outcome proved that the improvements made on the sugarcane juicer were effective and useful in increasing output for muscovado sugar production.

The improved sugarcane juicer showed remarkable high output capacity at about 580 kg/hr with juice yield of 52% as compared to previous output capacity of 200 kg/hr with a yield of 25%.

The improved sugarcane juicer

A.2. Partnerships

Our partnerships allow us to grow further and become more successful in serving the industry. We are truly grateful of our partnerships because these play a key role in creating more innovative products that will benefit the industry that we serve.

Below are some of the DOST-MIRDC's partnerships in 2020:

a. DOST-MIRDC – Futuristic Aviation and Maritime Enterprises, Inc. (FAME) partnership

For the project entitled, 'Prototype Development of FAME Transponder Casing for Maritime Use,' whose objective is to develop a robust casing for maritime transponders and accelerate product prototyping through additive manufacturing.

FAME is a Makati City-based company that provides reliable, secure, easily deployable, and affordable solutions to connect devices for real-time intelligent monitoring and management of resources in maritime, aviation, land transportation, and enterprise application.

b. DOST-MIRDC - Philippine Nuclear Research Institute (PNRI) partnership

For the project entitled, 'Prototype Development of Column for Radiation-Grafted Adsorbents for Wastewater,' that aims to develop a filter column to be used in heavy metal filtration of wastewater.

The PNRI, one of the research and development institutes of the DOST, focuses on research and development activities utilizing nuclear energy.

c. DOST-MIRDC - Research Development Center Army Support Command Philippine Army partnership

For the project entitled, 'Development of Conical Plastic Container and Packaging Box for the Improvised Explosive Device Disruptor' where the objective is to develop a reliable and functional prototype of an IED Disruptor through additive manufacturing that will be used in bomb disposal application by the Philippine Army.

The Research Development Center Army Support Command Philippine Army is a bureau under the Department of National Defense whose mission is to conduct research and development activities to enhance Philippine Army capabilities.

d. DOST-MIRDC - Metallic Pisces and Engineering Works (MPEW) partnership

For the project 'Optimization of MPEW Cast Iron and Non-Ferrous Melting Process and Equipment for Enhanced Energy and Output Efficiency.' Here, the goal is to improve the process of cast iron and non-ferrous metals melting.

MPEW is based in General Santos City and is engaged in casting and machining of various parts and machines for marine applications.

e. DOST-MIRDC partnership with R&J Jewelry Class Rings and Metal Crafts, Inc.

For the project 'Development of New Product Platform for Jewelry.' The project aims to identify new metal alloys for new range of product lines and establish manufacturing system for the new alloy including training of personnel.

R&J Jewelry Class Rings and Metal Crafts, Inc. is a corporation based in Bulacan with principal office in Pasig City, engaged in making specially-crafted jewelry and awards and recognition products in the country.

f. DOST-MIRDC - ATON Marketing partnership

For the project, 'A Comparative Study on the Metallographic Structure of Low Carbon Steel Bolts Case-Hardened Using Vacuum Carburizing Heat Treatment for Rice Thresher Application.'

The project objective is to improve the properties of its threaded bolts for its present use and other possible applications through carburizing and to develop other related products.

ATON Marketing, a company based in Antique, is engaged in selling of agricultural machineries, equipment and accessories.

g. DOST-MIRDC – Breath of Life Foundation partnership

For the project entitled 'Establishment of the Advanced Mechatronics, Robotics and Industrial Automation Laboratory (AMERIAL) in Support of the Metals and Engineering Industries' which aims to develop adult prototype of the OstreaVent Infant Ventilator.

Breath of Life Foundation was established with a mission and vision to decrease neonatal and infant mortality and morbidity in the Philippines by providing ventilators (OstreaVent) and other medical needs of newborn infants in the Neonatal Intensive Care Unit (NICU).

h. DOST-MIRDC – Laguna State Polytechnic University (LSPU) partnership

For the project entitled 'Formation of DOST-LSPU Local AMERIAL' whose objective is to enhance prototyping activities of their Laboratory and to provide industry support to the MSMES in the CALABARZON. The project is in collaboration with the DOST CALABARZON – Provincial S&T Center and DOST- MIRDC AMERIAL. Both intend to assists in the establishment of LSPU – LOCAL AMERIAL TEAM.

The LSPU – LOCAL AMERIAL TEAM, is a recognized center of research and development, in response to the need for security and safety needs of the MSMES intends to provide consultancy services under its Research Extension Program.

A.3. Papers

Our researchers also contribute to the industry by sharing what they have studied and developed through publications and presentations in national and international conferences. The Center takes pride in all that our R&D teams have accomplished.

A.3.1. Peer Reviewed Technical Papers Published in ISI/Refereed Journals

Paper Title: "Development of Functionally-Tested Hybrid Electric Train" by Pablo Q. Acuin, Jonathan Q. Puerto, Rodnel O. Tamayo, Geoffrey L. Abulencia and Rolando F. Tubig (DOI 10.1109/HNICEM48295.2019.9072793) published in IEEE Xplore on 23 April 2020.

Paper Title: "Design and Development of a Semi-Permanent Coupler for a Five-Coach Train" by Glen D. Espeña, Geoffrey L. Abulencia, Rodnel O. Tamayo, Jonathan Q. Puerto, Pablo Q. Acuin and Jayson P. Rogelio (DOI 10.1109/HNICEM48295.2019.9073523) published in IEEE Xplore on 23 April 2020.

Paper Title: "IoT- Based End-to-End Monitoring of Logistics and Tracking of Truck Vehicles Using Arduino Microcontroller" by Jayson P. Rogelio, Charles G. Juarizo, Jessie R. Balbin, and Elmer P. Dadios

Paper Title: "Categorizing License Plates Using Convolutional Neural Network with Residual Learning" by Jayson P. Rogelio, John Anthony C. Jose, Jose Martin Z. Maningo, Argel A. Bandala, Ryan Rhay Vicerra, Edwin Sybingco, Phoebe Mae L. Ching, and Elmer P. Dadios.

A.3.2. Peer Reviewed Technical Paper Presented

Paper Title: "Comparative Study on using On-Off and PID-based SCR Controller on Heat Treatment of AISI 4140 Steel" by Joey G. Pangilinan, Geoffrey L. Abulencia, Ariel R. Sernal and Serafin G. Aguilar at the 2020 IEEE 12th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management (HNICEM) on December 29, 2020.

Paper Title: IoT- Based End-to-End Monitoring of Logistics and Tracking of Truck Vehicles Using Arduino Microcontroller presented by Jayson P. Rogelio, Charles G. Juarizo, Jessie R. Balbin, and Elmer P. Dadios at the World Congress on Engineering 2019 in London, United Kingdom

Paper Title: Categorizing License Plates Using Convolutional Neural Network with Residual Learning presented by Jayson P. Rogelio, John Anthony C. Jose, Jose Martin Z. Maningo, Argel A. Bandala, Ryan Rhay Vicerra, Edwin Sybingco, Phoebe Mae L. Ching, Elmer P. Dadios at the 2019 4th Asia-Pacific Conference on Intelligent Robot Systems (ACIRS) in Nagoya, Japan.

Paper Title: Design and Development of a Semi-Permanent Coupler of a Five-Coach Train presented by Glen D. Espeña, Geoffrey L. Abulencia, Rodnel O. Tamayo, Jonathan Q. Puerto, Pablo Q. Acuin, Jayson P. Rogelio at the 2019 IEEE 11th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management (HNICEM) in Laoag, Philippines

A.3.3. Non-Peer Reviewed Technical Paper Published

Technical papers submitted for the DOST-MIRDC's Philippine Metals publication:

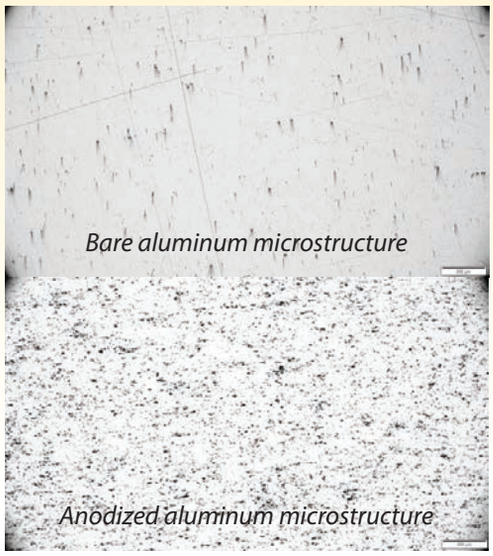
a. Effects of Anodizing Time in Tartaric-Sulfuric Acid on the Coating Thickness of Aluminum Alloy 6061 (Authors: Keziah M. De la Rama, Marvin Louise B. Carpena, Pedrito A. Domingo Jr., and Geoffrey L. Abulencia)

b. Formulation of Pattern Wax for Investment Casting (Authors: Florentino J. Lafuente, Celso L. Aguisanda, Juanito G. Mallari, and Karen C. Santos)

c. Study on the Plating Ability of Different Paint Using Various Carbon Pigments and Binders (Authors: Keziah M. De la Rama and Geoffrey L. Abulencia)

d. The Effect of Pouring Temperature on Microstructure of As-Cast Manganese Steels (Authors: Stan Kristian G. Ejera, Lemuel N. Apusaga, and Manolo G. Mena)

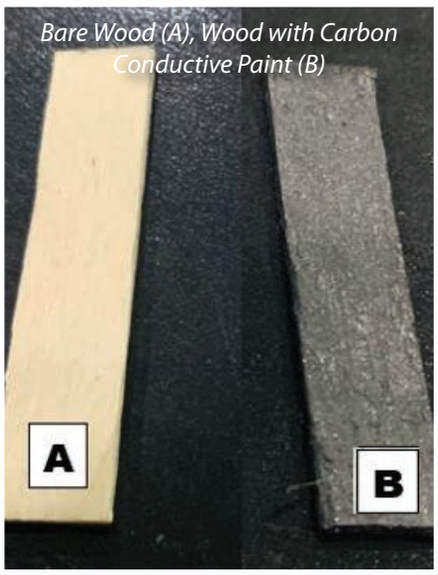
e. Fused deposition modelling of face shield frames for health workers amid the COVID-19 pandemic (Authors: Alvin M. Buison, Denise Daryl A. Florante, Maria Angela B. Faustino, Joseph Alfred V. Garcia, Ulysses B. Ante)



Bare aluminum microstructure

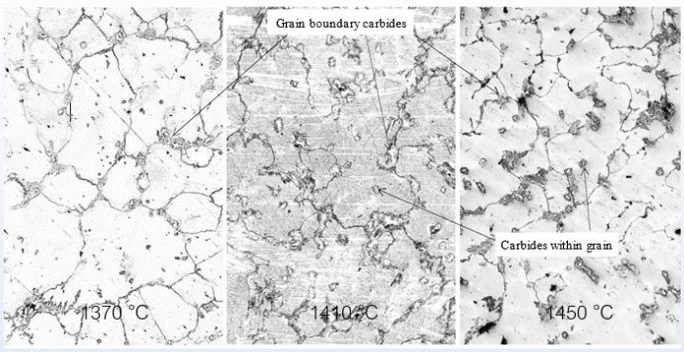
Anodized aluminum microstructure

Wax Specimen



Bare Wood (A), Wood with Carbon Conductive Paint (B)

Microstructures of AMS showing decreasing carbide segregation with increasing pouring temperature. Images are scaled differently to emphasize second phase segregation



3D printed Face Shield frames

A.4. Intellectual property (IP) filed and approved

A.4.1. IPs Filed

As researchers, we value and protect the results of our hard work. We have filed applications for intellectual property rights (IPRs). Listed below are the three (3) industrial design filed by our team.

1. Clay Jiggering and Jollying Machine with application number 32020000064 filed by Emerito V. Banal, Isidro D. Millo, Ronie S. Alamon, and Raymond D. Ocampo.

2. Pottery Wheel with application number of 32020000065 filed by Ronie S. Alamon, Joein L. Luces, and Raymond D. Ocampo

3. Hand Tractor-Attached Rice Transplanter with application number 32020050172 was filed by Isidro D. Millo, Emerito V. Banal, Donald V. Mateo, Ronie S. Alamon, Raymond D. Ocampo, Denise Daryl A. Florante, and Laureano L. Dalay

The following are R&D outputs filed as Utility Model:

1. Title: Method of Producing Ink for 3D Printing of Metallic Structures and Ink Composition of Obtainable Therefrom
Application Type/No: Utility Model 2/2020/050035
File Date: 12 February 2020

The utility model is mainly of a novel method of preparing an ink composition for 3D printing comprising non-toxic substances and metallic particles. This development is a result of the 3-month training on additive manufacturing at Case Western Reserve University, Cleveland, Ohio, USA on July-October 2019 under the project entitled, "Research on Advanced Prototyping for Product Innovation and Development Using Additive Manufacturing Technologies (RAPPID-ADMATEC)"

2. Title: Conductive Paint Composition
Application Type: Utility Model
eFiling Reference Code: 91A12T2152R20202H8
File Date: 15 December 2020

This utility model involves a conductive paint mixture, specifically a carbon-based mixture and this paint mixture is to be applied on non-conductive surfaces requiring electrical conductivity. Primarily, the objective is to utilize cheap and ordinary raw materials for the composition of conductive paint. This is a result of the project conducted in 2019 entitled, "Development of Carbon Conductive Paint for Electroplating of Non-Conductive Materials."

A.4.2. IPs approved

1. A Potter's Wheel for Throwing of Clay
The present utility model by Ronie S. Alamon, Joein L. Luces, and Raymond D. Ocampo with registry number of 22018001352 refers to a variable frequency drive (VFD) driven potter's wheel for forming manually by hand clay objects or shaped ceramic wares such as ceramic plates and ceramic cups.

A potter's wheel comprising generally of an independent part basin placed at the top of the working platform, an aluminum wheel mounted to a rotary chuck that is attached to the said working platform, a belt-driven shaft connected to the said rotary chuck, a variable frequency drive (VFD) provided for to drive the speed of the synchronous motor

that is connected to the said belt-driven shaft, and plurality of footings provided to adjust the height of the said working platform.

2. A Clay Molding Equipment for Jiggering and Jollying Methods

The present utility model by Ronie S. Alamon, Joein L. Luces, and Raymond D. Ocampo with registry number 22018001354 refers to a clay molding equipment provided for jiggering and jollying methods in forming clay objects to mass-produce uniformly shaped ceramic wares. A clay molding equipment comprising generally of a working platform, a tool-holder pivotably connected to an adjustable tool-stand, a rotary chuck attached to the said working platform, a belt-driven shaft connected to the said rotary chuck, a variable frequency drive (VFD) provided to drive and control the speed of the synchronous motor, and plurality of adjustable-footings provided to adjust the height of the said working platform.

B. Metals Industry Technology Transfer Program

Budget: PhP 22,107 million or 9% of the total allotment

Technology transfer activities of the Center are in the form of training programs, technical consultancy services, promotion of MIRDC-developed technologies, and information dissemination programs designed to improve human resource competence and awareness on the Center's activities. In terms of technology diffusion, the Center was able to attain the following:

- Successful transfer of five (5) technologies through six (6) licensing agreements with three (3) adopters. The unique technologies transferred for the year are the Spray Dryer, Vacuum Fryer, Water Retort, Freeze Dryer, and the 12Hp Single Cylinder Diesel Engine.
- Diffusion of 27 MIRDC technologies through exhibits, technology promotion, technology fora and technology dissemination.
- 100% of requests for technology transfer were delivered based on the mutually agreed timeframe.
- The three (3) technology adopters who responded to the Customer Feedback Survey administered by the Center upon completion of requests rated the service as satisfactory or better.

B.1. Technology Transfer and Commercialization

The Technology Diffusion Division (TDD) is the group with core function in the promotion, transfer, and commercialization of the developed technologies of the DOST-MIRDC. Among the three (3) sections under TDD, the Technology Advisory and Business Development Section (TABDS) is tasked to conduct:

- Intellectual Property (IP) Management
- Technology Forum
- Technology Transfer Day
- Technology Negotiation and Licensing
- Technical Consultancy Services
- Other Technical Services

B.1.1. Technology Transfer

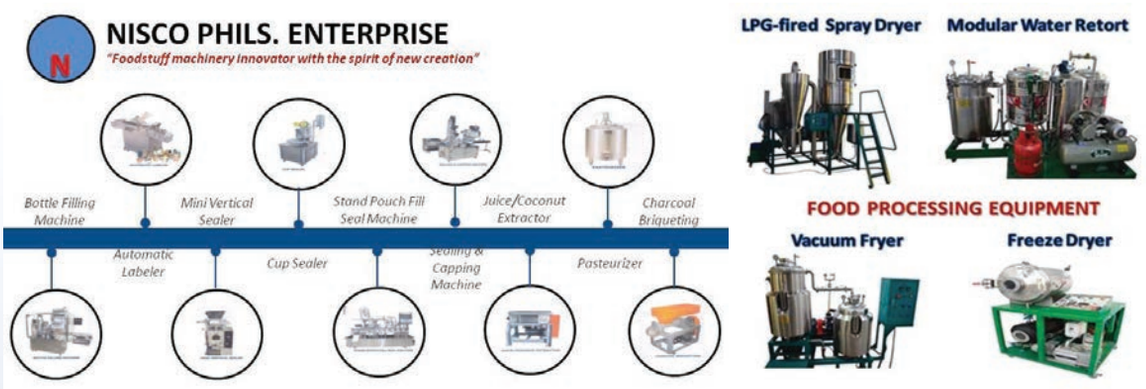
Nisco Phils. Enterprise and Eunics Marketing, the latest addition to the Licensed Fabricators of MIRDC's Food Processing Technologies

Nisco Phils. Enterprise, a single proprietor shop owned and operated by Ms. Yolly Dela Cruz since February 1991 and a manufacturer/fabricator of food, cosmetics, pharmaceutical packaging, processing machineries, has undergone intensive evaluation of the members of the Fairness Opinion Board (FOB) organized by the Department of Science and Technology – National Capital Region (DOST-NCR) on July 13, 2020. The evaluation was conducted to determine the company's qualifications as one of the licensees and accredited local fabricators of the DOST-MIRDC's developed food processing technologies – LPG Fired Spray Dryer, Vacuum Fryer, Modular Water Retort and Freeze Dryer. The said company was recommended as an approved licensee on September 17, 2020.

The Technology Licensing Officers of the DOST-MIRDC, headed by Engr. Mervin B. Gorospe, assisted in the preparation of the Business Model Canvass (BMC) for the four (4) food processing technologies. The TLO team also assisted in the evaluation of the 3-year Financial Statement Reports as to the liquidity ratio and the rate of return on investment of NISCO Phils. Enterprise which supported to the evaluation of the company's status and readiness for adoption of additional technologies for production.

Eunics Marketing, also a private Filipino-owned company in Iligan City, Lanao Del Norte, became a licensee of the LPG-fired Spray Dryer developed by the Center in 2020. Though the Fairness Opinion Report (FOR) was granted in 2018, the company only proceeded with the signing of licensing agreement upon seeing the market potential of the technology.

Eunics Marketing has also expressed interest to license other DOST-MIRDC-developed agri-equipment such as the Rice Transplanter and Harvester Attachments, and food processing equipment such as the Modular Water Retort and Vacuum Fryer in 2018. In 2019, they adopted the use of the "Plasmanoy," a CNC plasma cutter developed by the Center.



Products of Nisco Phils. Enterprises and licensed MIRDC-developed food processing technologies

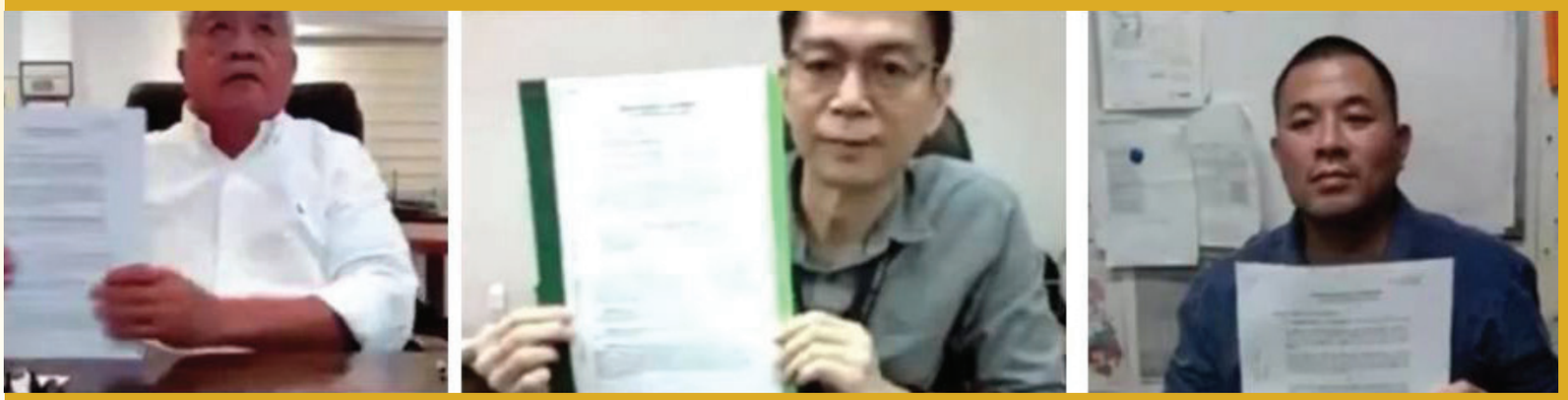


Figure 2. (Left) Mr. Ramon S. Uy, Sr, Chairman of R.U. Foundry & Machine Shop Corp., (Middle) Engr. Robert O. Dizon, Executive Director of MIRDC and (Right) Mr. Jerry Hui, President of Supercast Foundry and Machinery Corp. during the signing of Limited Manufacturing Agreement of the DOST-MIRDC-developed 12-Hp Single Cylinder Diesel Engine on October 5, 2020.

B.1.2. Commercialization

Commercialization of the 12-Hp Single Cylinder Diesel Engine (SCDE)

The DOST-MIRDC-developed 12Hp single-cylinder diesel engine (SCDE) is the solution to the country's dependence on imported engines. The SCDE is used to provide power to hand tractors, water pumps, driers, and other farm machineries. Being able to manufacture our very own prime mover diesel engine, we level up and boost the productivity and profitability of our farmers.

To commercialize the SCDE, the DOST-MIRDC partnered with two (2) private local companies, the R.U. Foundry and Machine Shop Corp. (RUFMSC) in Bacolod City, Negros Occidental and Supercast Foundry and Machinery Corp. (SFMC) in Valenzuela City, Metro Manila. This partnership was formalized during the signing of a limited manufacturing agreement last October 5, 2020. The virtual event was witnessed by the DOST Secretary Fortunato T. de la Peña, DOST Undersecretary Rowena Cristina L. Guevara, DOST VI Regional Director Rowen R. Gelonga, and MIRDC Deputy Executive Directors, Dr. Agustin M. Fudolig, and Engr. Jonathan Q. Puerto.

During his speech, DOST Secretary Fortunato de la Pena said that he wanted the DOST technologies to be transferred, utilized, and be used to generate more economic activity. Thus, he wanted the said technology be rolled out for the benefit of millions of Filipinos.

The activities incorporated in the agreement include the fabrication of 20 units of 12-Hp SCDE and the testing of its applicability to and compatibility with the existing farm machinery under actual farm conditions in various locations in the country. Likewise, the technical and business capability of the local technology will be assessed.

Figure 3. Engr. Mervin B. Gorospe, Sr. Science Research Specialist of MIRDC-TABDS, during the conduct of Online Investment Forum on iWIFE on July 6, 2020.

B.2. Technology Forum

B.2.1. Online Investment Forum on Integrated Wrought Iron Forming Equipment (iWIFE)

Engr. Mervin B. Gorospe, TABDS Technology Licensing Officer, supported the Online Investment Forum held on July 6, 2020, through providing information on the Integrated Wrought Iron Forming Equipment (iWIFE) technology of the DOST-MIRDC.

Dubbed as iWIFE, the equipment is a four-in-one manually operated forming device for iron bars. It can bend, twist, and roll wrought iron bar and strips. The iWIFE comes with a compartment where the user can store the tools and dies safely and with its portable design, the user can bring this versatile equipment anywhere.

The technical specifications and business opportunity plan, as well as the investment cost requirements of the iWIFE were also discussed. A total of eight (8) personnel from other government agencies, private firms, and entrepreneurs joined the forum via google meet.

B.2.2. DOST Innovations for Filipinos Working Distantly from the Philippines (iFWD PH)

In support to the program of the DOST on Innovations for Filipinos Working Distantly from the Philippines (iFWD PH) with an objective to provide opportunities for the Overseas Filipino Workers (OFWs) and their families to establish technology-based enterprises, the Center together with other DOST RDIs showcased its various developed technologies through an on-line presentation, last August 24, 2020, to encourage these OFWs to invest on business with big potential markets.

Follow-on activities such as one-on-one consultation with the Center's consultancy group on investment requirements for establishing machine shop and metal fabrication shop were conducted with interested OFWs. The purpose of the consultation is to level their expectations on the size of market, potential income, and financial and operational risks of their target business ventures.

B.3. Technology Diffusion

Despite the community quarantines implemented and while adhering to strict health protocols, the Center was able to reach out to stakeholders through online platform. This was possible through determined efforts of the DOST-MIRDC's Technology Diffusion Division (TDD), particularly the Technology Information and Promotion Section (TIPS), in carrying out its tasks in promoting the Center's technologies and services.

B.3.1. Technology Dissemination

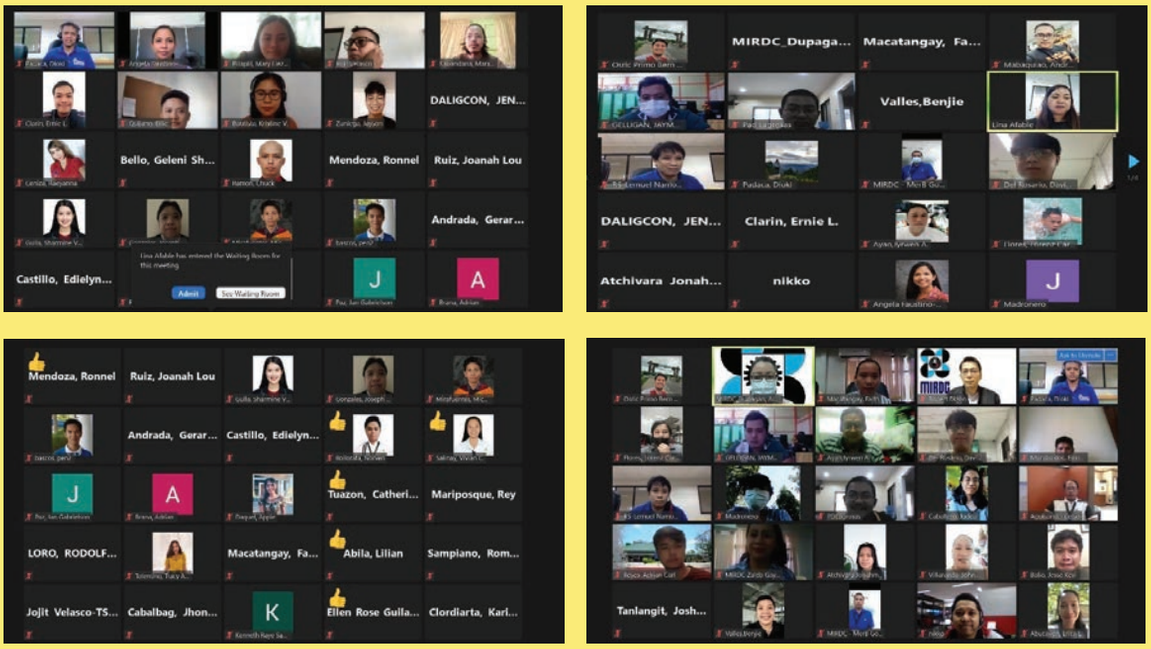
The TIPS was able to promote 27 technologies and services. The technologies and services were promoted by means of participation in exhibits, posting of IEC materials, and conduct of webinars. These technologies, developed by the Center, cover various requirements of the country, but are mostly meant to enhance the productivity of the metals, engineering and allied industries. During the pandemic, the Center engaged in heavy promotions of the technologies that will help create livelihood for Filipinos.

The 27 technologies promoted in 2020 are the following:

(1) 12-HP Single Cylinder Diesel Engine; (2) Building a Universal Mount for Heavy Barrel Automated Weapon Integration (BUHAWI); (3) Die and Mold Solution Center; (4) Automated Guideway Transit; (5) Spray Dryer; (6) Freeze Dryer; (7) Hybrid Electric Road Train; (8) Hybrid Electric Train; (9) Plasma Cutter; (10) Auto Parts Testing Laboratory; (11) Gear Making and Assembly Facility; (12) Surface Engineering Facility; (13) Water Retort; (14) Electric Potter's Wheel; (15) Integrated Wrought Iron Forming Equipment; (16) Jigger and Jolly Machine; (17) Tikog Flattening Machine; (18) Portable Manual Abaca Stripping Machine; (19) Face Shield; (20) Rice Transplanter Attachment; (21) Rice Harvester Attachment; (22) Compact Rice Mill Diverting Chute; (23) Super-Heated Steam Treatment System for Brown Rice; (24) Pandanus Leaves Slitter-Presser; (25) Heavy-Duty DC Inverter SMAW-GTAW Welding Machine; (26) Investment Casting; and (27) Advanced Manufacturing Center (AMCen).

B.3.2. Participation in DOST-led events

2020 National Science and Technology Week. This year's NSTW was held virtually from November 23 to 29, 2020. Themed as, "Agham at Teknolohiya: Sandigan ng Kalusugan, Kabuhayan, Kaayusan, at Kinabukasan," the event featured DOST agencies' technologies and services anchored with the 4Ks referring to the thrust of the Duterte Administration in addressing the pandemic. Through the TIPS, the Center actively participated in the conduct of webinars for the 2020 NSTW. The series of webinars were offered for free with the following topics: Integrated Wrought Iron Forming Equipment, held on November 23, 2020; Business in Welding and Fabrication Using "Stick" Welding Process Shielded Metal Arc Welding (SMAW), held on November 24, 2020; Leveling Up Farm Mechanization (A Webinar Featuring the DOST-MIRDC's Rice Transplanter Attachment/Rice Harvester Attachment), held on November 25, 2020; Fundamentals of Defect-Free Casting Products (A Webinar Featuring the



Screenshot of participants

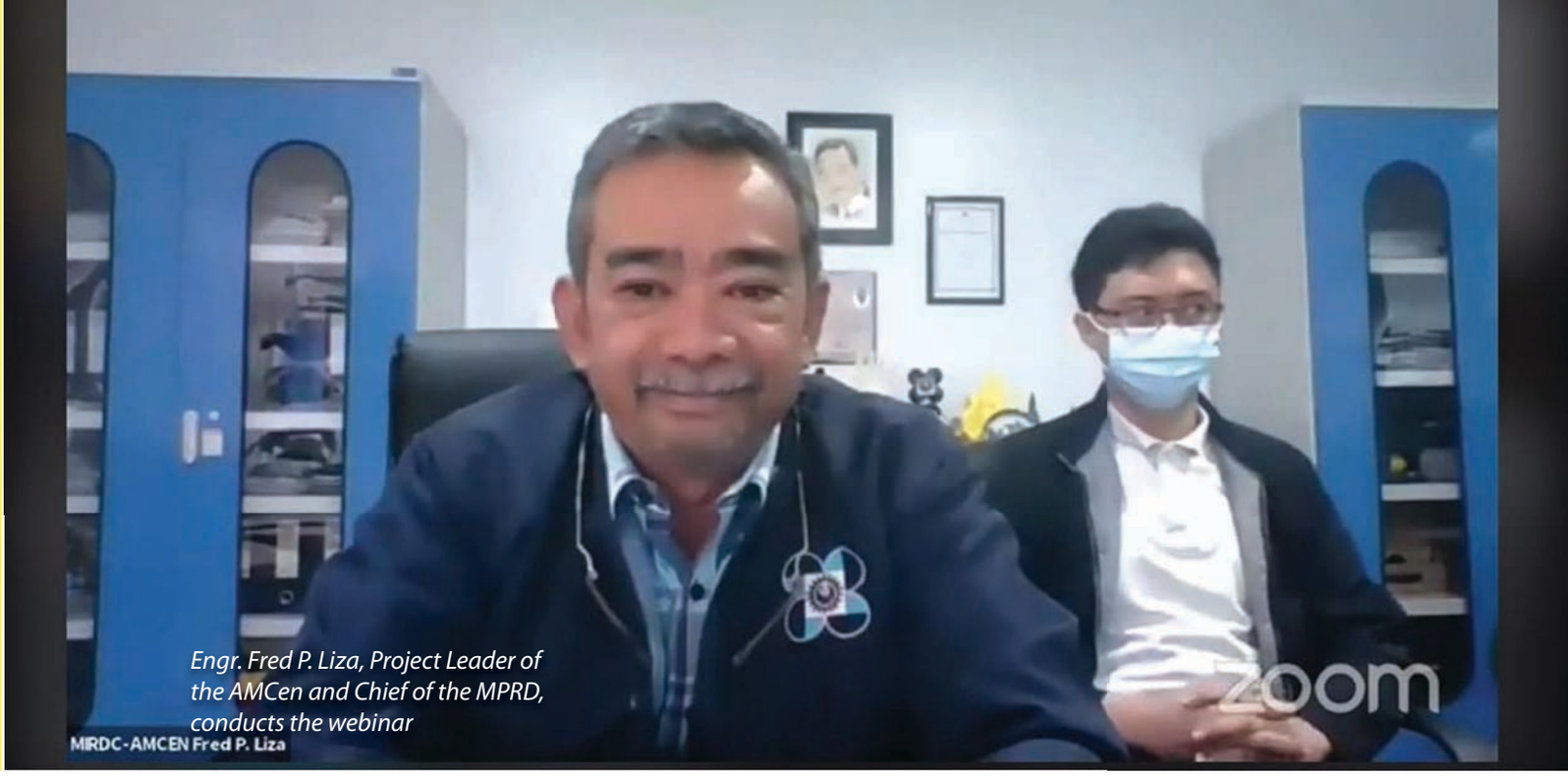
Table 1. Webinars Conducted During the Celebration of NSTW

Title of Training	No. of Participants
Twist, Bend, Curl, and Roll Metal Pieces: A Creative Way to Make Business using the Integrated Wrought Iron Forming Equipment (iWIFE)	35
Business in Welding and Fabrication Using Stick Welding Process	43
Level Up Farming Mechanization: Rice Transplanter Attachment (RTA) and Rice Harvester Attachment (RHA)	12
Fundamentals for Defect-Free Casting Products	53
The Hybrid Electric Road Train: To be Mass Produced in the Province of Isabela	10
AMCen: Manufacturing Beyond Conventional	46
Total	**199**

Investment Casting Facility of the DOST-MIRDC), held on November 26, 2020; The Hybrid Electric Road Train: To be Mass Produced in the Province of Isabela, held on November 27, 2020; and AMCEN: Manufacturing Beyond Conventional, held on November 28, 2020.

Providing a significant contribution during conduct of webinars for the celebration of the 2020 NSTW was the Center's Industrial Training Section, also a part of the TDD. The webinars were composed of lectures and videos showing the step by step process on the technologies presented. A testimonial on the success story of Mr. Nimrod Perez, welding and fabrication shop owner from Iloilo City highlighted the webinar on "Welding and Fabrication Using Stick Welding

Engr. Lemuel N. Apusaga conducts the webinar on Fundamentals for Defect-free Casting Products.



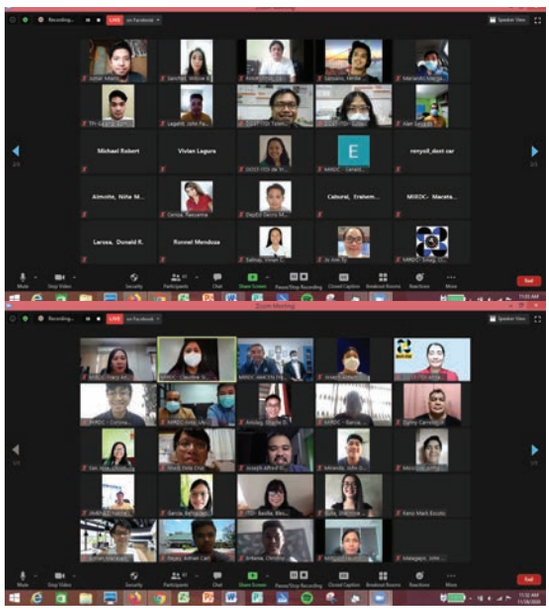
Engr. Fred P. Liza, Project Leader of the AMCen and Chief of the MPRD, conducts the webinar

Process." Table 1 lists the webinars conducted during the celebration of NSTW with the number of participants who joined the said events.

The MPRD actively participated in the 2020 NSTW. The webinar entitled, 'Fundamentals for Defect-Free Casting Products,' was developed and conducted by Lemuel N. Apusaga and Jose Bernardo Padaca III.

Aside from this, the MPRD was also in charge of the development and conduct of the webinar entitled, 'AMCen: Manufacturing Beyond the Conventional.' Key personalities in the said webinar are Engr. Fred P. Liza and Dr. Blessie Basilia.

Also in support to the NSTW sa Amihanang Mindanao celebration, Engr. Ma. Girlie M. Millo, presented the Rice Transplanter Attachment (RTA) and Rice Harvester Attachment (RHA) for Handtractors during the "TechNegosyo Ta.



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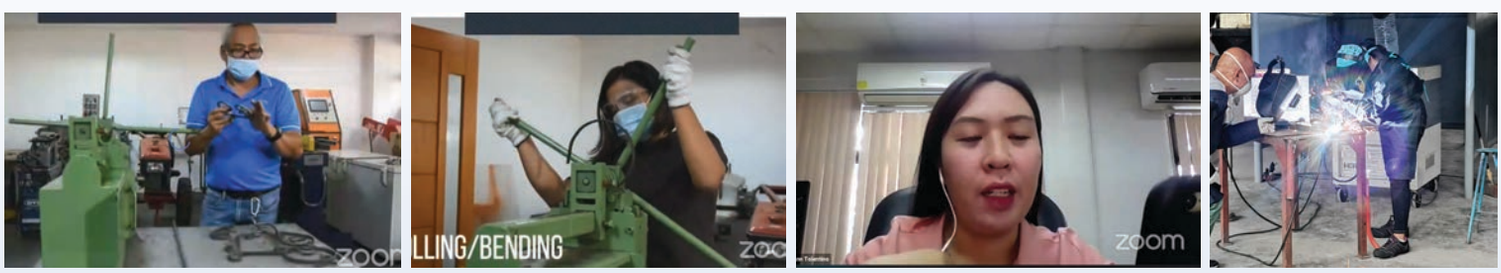


Other scenes of the MIRDC webinars during the virtual 2020 NSTW featuring MIRDC technologies coupled with open forum and technology demonstrations.

Mauswagong Pag-uma" webinar of the DOST Regional Office No. 10, last November 24, 2020. The webinar was attended by local farmers, farmers cooperatives, academe, and interested individuals.

Forum on DOST RDI's Developed Technologies. The Center also took the opportunity to conduct a webinar through the request of the DOST Provincial Science and Technology Center (PSTC) - Rizal.

On October 16, 2020, we reached out to various industry players as well as to members of the academe during the 7th series of Forum on DOST Research and Development Institute (RDIs) Developed Technologies featuring technologies from the DOST-MIRDC.

The technologies presented were the Rice Transplanter Attachment, Rice Harvester Attachment, Super-Heated Steam Treatment System for Brown Rice, and Compact Rice Mill Diverting Chute for rice farming and processing; Spray Dryer, Freeze Dryer, Vacuum Fryer, and Water Retort for food processing; Pandanus Leaves Slitter-Presser and Tikog Flattening Machine for the mat industry; and Hybrid Electric Train (HET) and

Hybrid Electric Road Train (HERT) for mass transportation.

The online forum turned out to be a productive and promising interaction as fabricators expressed interest in the technologies, researchers became interested in reading the Center's technical papers, and entrepreneurs inquired about the home-grown equipment.

B.3.3. Production and Dissemination of IEC Materials

Ads, brochures, posters. The Center produced IEC materials to disseminate information on the Center's technologies and services. Most of these IEC materials were designed specifically for target markets, e.g. fabricators, end-users, LGUs, and academe. These IEC materials were mostly posters and flyers. During the pandemic where face-to-face interactions were not allowed, the Center's IEC materials are in digital format and were sent to our targeted audience through email. These materials were also posted on social media for a more effective dissemination. Other IEC materials published and disseminated by the DOST-MIRDC include the 2019 MIRDC Annual Report, the Philippine Metal Products Directory, the Philippine Metal Stamping Industry Study, and the 2020 Philippine Metals.

Normally, the Center opens its doors to visitors who request for plant tours. During the pandemic, virtual plant tours became part of the new normal. The Center showcased the Analysis and Testing Laboratories for a virtual tour. For this activity, the TIPS handled

Samples of developed IEC materials and content for the MIRDC website

the production of promotional videos which were also posted on social media and shared to other DOST agencies as well.

Metalworking Industry Database. The Center developed and continuously updates a database of metalworking companies nationwide according to industry processes: machining, welding, heat treatment, electroplating, metalcasting, die and mold, stamping, and forging. This enables the Center to quickly find information or profile of the companies needed for a specific purpose.

B.3.4. Conduct of Industry Study

The Center conducts industry studies yearly to determine the status of the metalworking companies so that appropriate programs and projects are implemented to effect significant intervention. In 2020, however, the usual face-to-face interviews were not possible, making it very challenging for the survey team to carry out an industry study. To take the place of the industry study, the Center launched a research on: "Impact of COVID-19 Pandemic to the Philippine Metals Industry: An Associations' Viewpoint." The TIPS took charge of handling coordination and actual conduct of the research, where data gathering was made possible through online interviews and meetings. Key informants were from the different industry associations such as the Philippine Welding Society (PWS), Aerospace Industries Association of the Philippines Inc. (AIAPI), Metalworking Industries Association of the Philippines, Inc. (MIAP), Mechatronics and Robotics Society of the Philippines ((MRSP); Philippine Die and Mold Association (PDMA); Philippine Metalcasting Association, Inc. (PMAI); and Philippine Iron and Steel Institute (PISI).

B.3.5. Focus Group Discussion (FGD)

After data gathering, an FGD was conducted. This was participated in by the industry and government representatives to validate the results of the survey and interviews. Also, the concerns of the metalworking and engineering industries were aired and directed to respective government offices to address such. This initiative establishes a strong collaboration between the industry and government.

C. Metals Industry Science and Technology Services Program

Budget: PhP 32,834 million or 13% of the total allotment

Science and Technology (S&T) services programs of the Center are offered to meet the requirements of various industries on verification of material composition and quality checks to companies belonging to the semiconductor, construction, manufacturing, machining and fabrication, welding, tool and die, forging, metal casting, heat treatment, and other sectors. Summarized below are the performance of the Center for this program.

- A total of 3,716 technical services were rendered for the year by the different frontline services of the Center like analysis and testing, resource sharing (facility and actual time sharing), physical metallurgy, technical consultancy, and industrial training.

- Out of 3,716 technical services rendered, 98.22% were provided on the required timeframe.

- The Center recorded 443 new clients and 1,725 returning clients served by the frontline delivery units for the year which totaled to 2,168 unique clients (no double counting across delivery units).

Despite the challenges outside and within the organization, 2020 was indeed a productive year as the DOST-MIRDC delivers with vigor and enthusiasm what has been promised for the Filipino people in general, and to the metals and engineering industry, in particular.

C.1. Analysis and Testing

The Analysis and Testing Division (ATD) makes every effort to continuously serve the public despite the pandemic. Laboratory personnel acted as frontliners by attending to the calibration and testing needs of various customers, especially businesses in the metals industry. The ATD proactively provided technical services. The accomplishments of the division during this time of pandemic shows that testing and calibration are essential services that play an important role in our country.

ATD staff conducting in-plant calibration during MECQ

Online meeting of TC61 – Ferrous Pipes and Fittings

PAB Surveillance Visit on ATD Laboratories

To inspire confidence in its customers and to ensure the competence of the laboratories and its management system in accordance with ISO 17025: 2017 version, general requirements for the competence of testing and calibration laboratories, the testing laboratories of the ATD were audited by experts from government and private sectors led by DTI's Philippine Accreditation Bureau. The external audit, conducted through remote assessment using MS Teams platform on 26 and 27 November 2020, was the second surveillance visit to the testing laboratories.

Likewise, the Instrumentation and Metrology Section was accredited with the latest version of ISO17025 and maintained this accreditation until this time. The section is scheduled for surveillance visit in the first quarter of 2021.

Support to DTI Programs Promoting Quality and Safety

The ATD continuously supports the Philippine Accreditation Bureau (PAB) by becoming part of the PAB pool of Technical Assessors and Experts. The ATD's pool of technical assessors and experts is composed of Engr. Rodnel O. Tamayo, Engr. Rommel N. Coroña, Engr. Arlene G. Estacio, Engr. Florante A. Catalan, Engr. Gina A. Catalan, Engr. Christine P. Avelino, and Engr. Arvin Yan V. Pacia. They are responsible for assessing the conformance of testing and calibration laboratories in accordance with ISO 17025 standard.

On the other hand, testing laboratory staff were also involved in the formulation of Philippine National Standards used for the mandatory requirement for materials and products prior to consumer use.

There are currently five Technical Committee members in ATD, namely Engr. Florante A. Catalan (TC 44 – Road Vehicles), Engr. Gina A. Catalan who acts as the Vice-Chairman (TC54 - Jewelry and TC61 – Ferrous Pipes and Fittings), Engr. Karl Andrew S. Chavez (TC 44 – Road Vehicles), Engr. Christian Glenn S. Ligon (TC86 – Ships and Marine Technology and TC on PNS/DOE FS 2: 2008 LPG Refilling Plant) and Engr. Edward A. Malit (TC 06 – Gas Cylinders). These standards were thoroughly reviewed periodically by stakeholders and committee members coming from the industries, academe, private

companies, manufacturers, and government institutions.

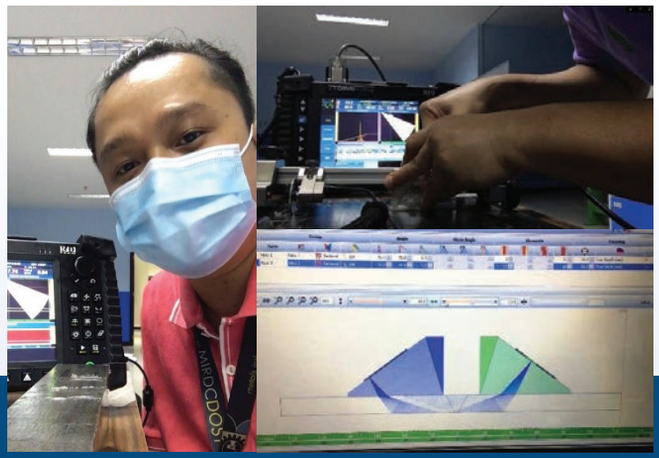
The Center proudly reports that the Technical Committee members were commended in their commitment in standard development in BPS's Standard Stakeholders Conference during last year's World Standards Day and National Standards Week.

Certificate of Participation from BPS during Standards Stakeholders Conference 2020

Conducted seminars

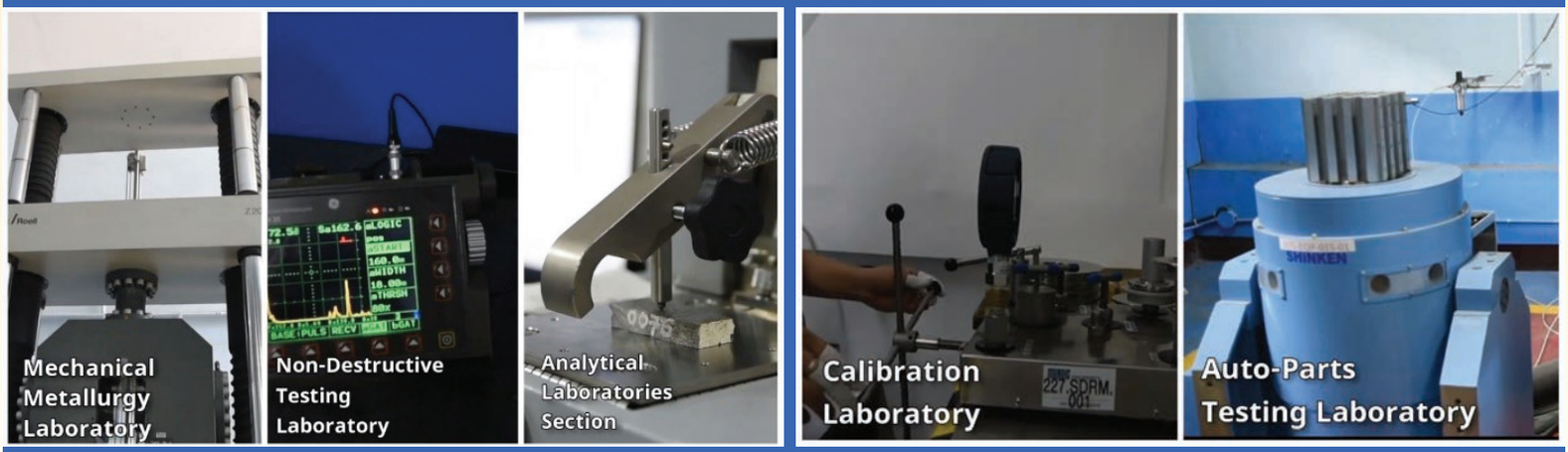
Online seminars were also conducted to support the training needs of metals industries. Non Destructive Laboratory conducted a live webinar entitled, 'Introduction to Phased Array Ultrasonic Testing (PAUT)' last December 2020. Engr. Florante Catalan and Engr. James Asher Cabarloc shared their knowledge and expertise on the principle and operation of this sophisticated equipment to the academe, construction industries, and NDT practitioners.

Another webinar was conducted by Engr. Florante Catalan together with Engr. Gina Catalan on PNS 49:2002 (Steel bars for concrete reinforcement – Specifications) and PNS 657:2008 (Hot Rolled Steel Sections – Equal Leg Angles – Specifications) last July 24, 2020 attended mostly by participants coming from the metals sector. The objective of the seminar is for the participants to have knowledge on the requirements of the mandatory standard on deformed steel bars and equal leg angle bars.



Engr. James Asher Cabarloc discussing the functions of PAUT

Awareness seminar on hot rolled bar products



Featured Laboratories during the "SPICES to DOST Labs" event

SPICES to DOST Labs

The laboratories of the ATD were showcased in DOST-TAPI's program "Strategic Promotion thru Integrating Collaboration and Engagement of SMEs to Support the Technology Transfer and Commercialization of DOST-developed Technologies including Testing Laboratories and Services."

Alongside with the TDD-TIPS, the ATD prepared a video of the laboratories featuring the services and sophisticated equipment of the laboratories that are offered and used by the Center. The heads from different companies and agencies, from government, academe and private institutions who benefitted from ATD's services, gave their testimonials and expressed their satisfaction on the service that they experienced. A question-and-answer portion at the latter part of the program was conducted to assess and respond to the needs of the industry.

Support on PRRD's Flagship program "Build Build Build"

The Mechanical Metallurgy Laboratory provided testing to several infrastructure projects in support of the current administration's flagship program "Build, Build, Build." This includes Metro Manila Subway, LRT2 Extension, Bridge Projects, and the recently opened Metro Manila Skyway Stage 3 that connects the SLEX and NLEX and aims to decongest the traffic in Metro Manila. Numerous samples to be used in various projects were tested to ensure the quality and safety of the materials.

Tested samples (anchor head, wedge sleeve, bolts, nut, stud bolt and washer) from various projects under "Build, Build, Build" program

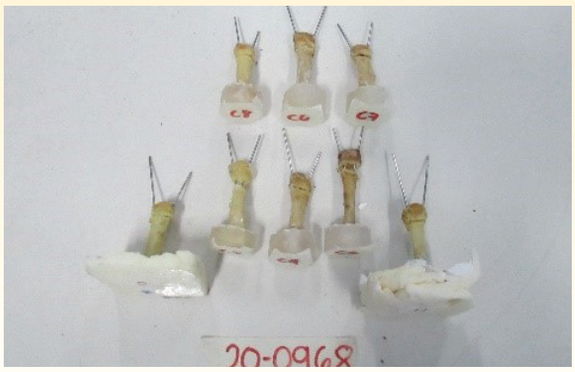
(L) New Comparator GBCD-100A that can calibrate grade 0 steel and ceramic up to 0-100mm; (R) Dimensional measurement of test sieve

Meanwhile, the Metrology Laboratory acquired new standards to cater to the calibration needs of this flagship program. Test sieves were measured precisely using HP Laser. Test sieves are screening medium with openings of uniform size and shape mounted on a rigid frame. These are used in food, pharmaceutical, agricultural and mining industries performing particle analysis.

Renovated Facilities

To further improve the service to its customers, the Division Head Office was transformed into centralized business area of the division. The Instrumentation and Corrosion Laboratories also had their facility renovated to further increase their testing and calibration capabilities. The weighing area is isolated in the Corrosion Laboratory to separate areas with incompatible activities. Sinks are more acid resistant, a feature that makes them appropriate for conducting analysis. On the other hand, the Instrumentation Laboratory upgraded its facility to a more convenient calibration rooms, accommodating additional calibration jobs.

Newly renovated Instrumentation Laboratory and Corrosion Laboratory



Finger bone samples under flexural load

Streamlining Activities in compliance with RA 11032

The ATD has done its share to comply with the Republic Act 11032 or the Ease of Doing Business Act by updating the requirements in the Citizen's Charter. A complete checklist of requirements and a simplified step-by-step procedure was clearly identified in order to process a testing and calibration job.

The centralized business area of the division and implementation of Unified Laboratory Information Management System (ULIMS) made a major impact to the reduction of overall processing time of the service. ULIMS eliminates the redundant processes required by the laboratories in processing the technical service request. An online tracking system is also implemented for the customers to monitor the status of the job anytime.

Instrumentation and Metrology Section (IMS)

The Center's outstanding income generating section served 591 companies amounting to 8.75M Php with 7,390 total samples calibrated. With new signatories approved by the PAB (Engr. Christian Ibañez, Engr. Arvin Yan Pacia, Mr. Luis Forbes and Ms. Mary Joy Baroña) and newly hired and promoted staff (Mr. David Santos and Ms. Mary Joy Baroña), the section has accomplished a total of 1599 technical service requests.

The IMS is also authorized by the DTI-PAB as reference laboratory to support measurement audit activities of the following laboratories: Welltech Service Corporation, Premier Physic Metrologie, Acculab Calibration Laboratory, Inc., Sonju Engineering Services, and Southern Metrology and Calibration Services, Inc.

Physical Laboratories Section (PLS)

The PLS performed splendidly even during this time of pandemic by completing 5887 total number of samples under 1351 total technical service requests generating 3.49 M Php. Overwhelmed with numerous samples and products required to undergo mandatory testing, the section managed to extend its service not just to the metals industry, but also to different sectors of the country.

The Mechanical Metallurgy Laboratory (MMS) maintained its confidence in providing test results after passing the proficiency testing provided by Collaborative Testing Services, Virginia USA. MML enrolled for the strength, ductility and hardness using 50KN UTM and Rockwell Hardness Tester Superficial scale. The proficiency test was participated by 104 laboratories worldwide.

Before and after the application of flexure load on Thermit welded rails

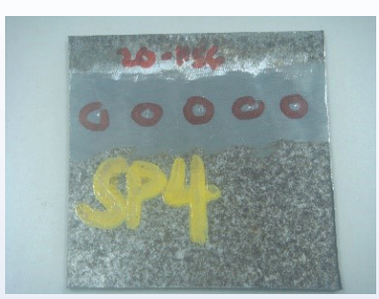
Finger bone samples were investigated using the 1-Ton Universal Testing Machine. The procedure was done by an Orthopedic to an actual broken finger and was set up to simulate the physical condition of the sample. A medical grade wire implanted to the affected finger bone, was subjected to bending / flexural load to differentiate the quality of the two samples.

The Mechanical Metallurgy Laboratory plays a vital role in the LRT Line 2 East (Masinag) Extension Project by conducting flexural test on rail samples. The objective of the test is to assess the quality of the Thermit Weld that is used to connect rails. Using the available jigs and fixtures, the laboratory managed to perform the requirement of the standard accurately. The samples shall withstand a predetermined load set by the customer in order to pass the test.

Samples from the Philippine National Police (PNP) were also assessed using the hardness testers in the laboratory. Hardness values were determined on the dye that is used in the manufacturing of bullet casing. The ductility of the material used to arrest bullets was checked by Rockwell hardness test and is checked whether it complies with the material specification.

The year 2020, Non-destructive Testing started with the influx of test samples from different industries. The Tiger Bronze Bushing was in good shape, but after inspection, a long linear defect was revealed after the conduct of Penetrant Testing (PT). With almost a half-ton weight, the Tiger bronze bushing made it difficult to prepare and test all areas concerned. Sample preparations are all in accordance with the applicable / specific test standard. Next is the Fluorescent

Samples used for the manufacture of bullet casing



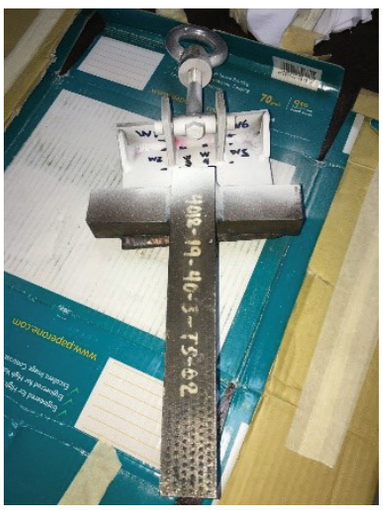
Firing plate

Defect on Tiger Bronze Bushing after the conduct of PT

Fluorescent Magnetic Particle Testing on M203 grenade launcher

Integrity test on Tanks

NDT staff conducting PT on Boiler Housing



Water Retort Locking Assembly after Penetrant Testing

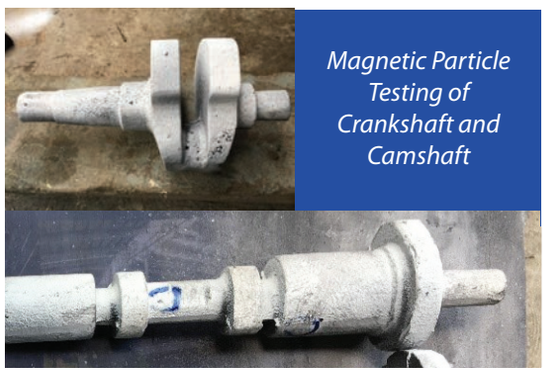
Magnetic Particle Testing of a M203 grenade launcher. Local Fabrication have certainly boomed, this boiler housing is just one of the several projects of reputable company and more of these is expected to come. Tanks that contains water, fuels, and acid were also inspected from a plant, that produces magnets, as requirement by the Department of Labor and Employment (DOLE). A requirement that gave Non-destructive Testing more than a thousand points which is actually an on-going job from the previous year.

The NDT Laboratory has always been supportive of the projects in and out of the agency. For several years now, the laboratory has the highest 'internal jobs' in terms of samples and man-hour. This year is no exception. Tested samples include crankshaft and camshaft of the single cylinder engine being develop by our own agency, locking mechanism of water retort, DOST Central Office roof deck, and the AMCEN Building. These samples were prepared in accordance with the applicable test standard prior to the conduct of the test.

Bond Test on Babbit Bushing and Magnetic Particle Testing and Ultrasonic Testing of Shaft

Before the year ended, samples for inspection kept coming. Critical during this time are parts for power plants like bushing and shafts for large generators where maintenance is usually conducted during the holidays. These parts were refurbished by a technology called thermal spraying.

The Auto-parts Testing Laboratory was the sole laboratory chosen by the Department of Transportation to conduct the measurement of Modernized Public Utility Vehicle. The laboratory measured 37 units of varied models for the whole year in line with the government's PUV Modernization Program to comply with Philippine National Standard 2126: 2017 Public Utility Vehicles Class 2 and Class 3 - Dimensions. The laboratory uses Calipers, Steel Rule, Level Bars and Laser Distance meter to measure the required major parameters specifically the overall



Magnetic Particle Testing of Crankshaft and Camshaft

DOST Central Office (above) and AMCEN Building (below)

Jeepneys under the PUV Modernization Program

height, width and length, wheelbase, rear and front overhang, cabin dimensions, seat dimensions and seat layout, minimum space for each standing passenger, step board dimensions, service door dimensions, emergency exit dimensions, handrails, external projection and field of vision.

Analytical Laboratories Section

The Analytical Laboratories Section served a total of 610 Technical Service Requests with a total of 1178 samples to 145 companies. The section generated an enormous amount of 2,159,569 Php, exceeding its target by 44% despite the consequences of pandemic.

One of the state-of-the-art equipment of the Center is Physico-Chemical Laboratory's Optical Emission Spectrometer. This is the main equipment used by the laboratory in conducting chemical analysis on metals, analyzing the contents of elements on the sample. The equipment accurately gives the carbon, sulfur, silicon, manganese, and phosphorus contents of the metal particularly on structural materials such as deformed steel bars and angle bars. Sizes 10mm and 12mm are ground and placed in the special holder to properly examine the samples.

ALS staff made sure that available work-related and relevant webinars sponsored by government agencies and equipment suppliers were attended for personnel development During the Enhanced Community Quarantine period. Likewise, ALS staff namely, Engr. Gina Catalan, Ms. Jo Marie Venus Agad, Mr. Morris Pioquinto, and Ms. Mary Joy Bautista conducted the following online seminars: Measurement of Uncertainty Computation: Top Down Approach; Awareness Seminar on Method Validation; Quality Control Chart for Analytical Process; and Chemical Spillage Response Seminar, respectively, to provide continuous learning for MIRDC people.

ALS staffs conducting analysis using Optical Emission Spectrometer

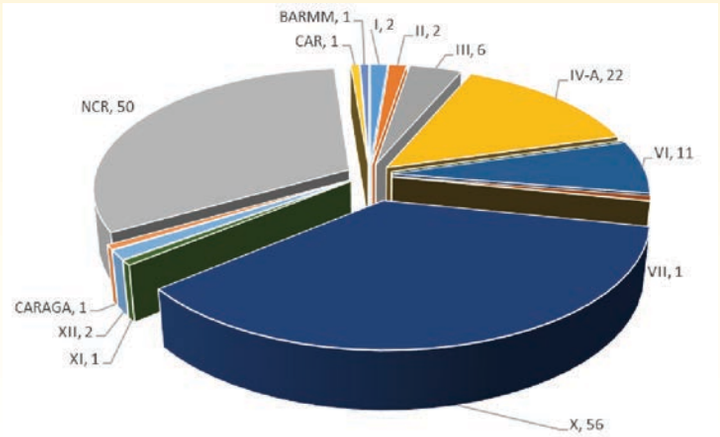
The Corrosion Laboratory participated and satisfactorily passed the proficiency testing for the Determination of Mass of Zinc Coating per Unit Area using ISO 1460 method last February 2020. The laboratory is currently anticipating the same results on the Intralaboratory Comparison of Various Tests (Bend, Impact, Pencil, Thickness of Inorganic and Organic Coatings applied in Ferrous Base Metal) to satisfy ISO 17025 requirements.

C.2. Technical Consultancy

For the period in review, the Center rendered a total of 156 technical assistance activities in the fields of Materials Identification and Selection, Metalcasting, Basic Machining processes, Heat Treatment, Surface Finishing, Food Processing Equipment, Productivity Programs, and other processes, and review and evaluation of proposals for SET-UP Program.

Table 2. Total Number of Technology Assistance Rendered Per Region

REGION	NO. OF TECHNICAL CONSULTANCY / ASSISTANCE
I	2
II	2
III	6
IV-A	22
VI	11
VII	1
X	56
XI	1
XII	2
CARAGA	1
NCR	50
CAR	1
BARMM	1



C.2.1. Technical assistance

1. Establishment of Muscovado Processing Plant in Maraymaray Sugarcane Plantation, Don Carlos, Bukidnon

To support the farmers engaged in the muscovado enterprise in South Bukidnon, a facility worth P5.17-million was erected within the Maraymaray Sugarcane Plantation, in front of the Bukidnon Farmers CARP Beneficiaries Multipurpose Cooperative (BUKIFCARB MPC) Office in Purok 1-C, Barangay Maraymaray, Don Carlos. Its objective is to process muscovado sugar from raw sugarcane harvested from the farms of BUKIDCARP MPC, BFI Employees Agrarian Reform Beneficiaries Cooperative (BEARCO), and Maraymaray Agrarian Reform Beneficiaries Cooperative (MARBC) located within the plantation.

Figure 4. (From top) Boling, Milling & Bagasse Houses; Evaporator Sets (Cooking Vats); and Cooling Rough.

Figure 5. Lecture and demonstration on muscovado processing and the turn-over ceremony of the facility on December 10, 2020.

The DOST-MIRDC, through the expertise of Engr. Felipe Fachoco, provided technical consultancy assistance in the (a) construction of the evaporation system particularly, the location of the train kettle furnace which is critical in flue gas production; (b) identification and evaluation of the proper specifications and installation of the juice extractor machine; and (c) conduct of technology demonstration on the operation and production of muscovado.

The Center was part from the ground breaking ceremony on June 19, 2019 up to the actual turn-over of the Muscovado Plant in December 10, 2020.

2. Preparation for the ISO 9001:2015 Certification of MANNA Shameyn Enterprises, Inc.

To continuously provide quality services and products, especially during the COVID-19 health emergency, the MANNA Shameyn Enterprises, Inc. based in the National Capital Region sought the assitance of DOST-NCR and MIRDC in their quest to be certified to the requirements of ISO 9001:2015 standard last July 16, 2020.

The company built by Mr. Ramil Serrano in 2010, one of the recipients of the DOST SET-UP Program, manufactures hospital beds and various medical equipment.

Figure 6. Hospital bed and medical equipment products of MANNA Shameyn Enterprises Inc.

3. Final Journey to the ISO 9001:2015 Certification of the DOST National Academy of Science and Technology (DOST-NAST)

After a period of preparation for the documentation of the Quality Management System (QMS) of the National Academy of Science and Technology (NAST), the long journey was rewarded during the successful audit conducted on 2020 by TUV – Rheinland Phils.

Figure 7. Conduct of Certification Audit by Dr. John Faustorilla of TUV-Rheinland Phils. on the QMS of the NAST on September 7, 2020.

C.2.2. Other Technical Services Provided

1. Conduct of Measurement Audit

The TABDS, in coordination with the ATD, provided a total of eight (8) measurement audit jobs for five (5) companies during the year in review.

The measurement audits are conducted by comparing the ATD's laboratory results to values established by a reference laboratory, taking into account the measurement uncertainties assigned to the reference value and those reported by ATD's laboratory. Performance is evaluated by the internationally accepted method of calculation En ratios.

Table 3. List of companies which availed the Measurement Audits services

COMPANY	INSTRUMENTS
1. Ark One Technologies	• Digital Multimeter • LCR Meter
2. Philippine Geonalytics Calibration and Measurement Laboratory Corporation	• Multimeter • Multifunctional Process Calibrator
3. Sonju Engineering Services	• Digital Torque Meter • Bore Gauge • Digimatic Indicator • Plug Gauge • Torque Meter
4. DOST RSTL – Davao	• Steel Rule • Drying Oven
5. Jarcet Business Shared Services (Phils.), Inc.	• Incubator

C.2.3. Establishment of the Metals and Engineering Innovation Center (MEIC) in the Cordillera Administrative Region, Regions I, II, III and X

Metals and engineering (M&E) cut across industries and serve as an enabler of other industries especially, where mechanization is indispensable to increase productivity, boost innovation and improve product quality.

The DOST-MIRDC, being the sole government entity directly supporting the metals and engineering industry with services designed to enhance its competitive advantage, was tasked to establish innovation centers in every region that will serve as venue for the conduct of research studies for the development of new innovative metal parts and components, products, machineries, and other services, through the collaboration of the academe with the industry. The innovation centers are also envisioned to offer practical solutions to pressing metals and engineering problems encountered in the community or in the region through the expansion of the partner university's pool of experts in the field of metals and engineering.

On December 22, 2020, the Center conducted a Virtual Soft Launching of the Metals and Engineering Innovation Center (MEIC) in Cordillera Administrative Region, Regions I, II, III and X. In line with the soft launching is the presentation of the signed Memorandum of Agreement between DOST-MIRDC, concerned DOST Regional Offices and the five (5) State Universities and Colleges.

The agreement highlighted the roles and obligations of each partner entities for the establishment of the MEIC inside the campuses of Ifugao State University (IFSU), Don Mariano Marcos Memorial State University (DMMMSU), Cagayan State University (CSU), Nueva Ecija University of Science and Technology (NEUST), and University of Science and Technology of Southern Philippines (USTP).

The soft launching was graced by DOST Secretary Fortunato T. Dela Peña and Undersecretary Rowena Cristina L. Guevara, along with DOST-MIRDC Executive Director Robert O. Dizon, DOST Regional Directors from CAR, Regions I, II, III and X, and University Presidents and representatives from IFSU, DMMMSU, CSU, NEUST and USTP.

In his keynote message, Secretary De la Peña challenged the presidents of the universities to work together (with other SUCs), and complement these initiatives. They may set targets to contribute to the development of local industries (metals and engineering sector) in their respective regions. Meanwhile, in their message of acceptance, the five SUC presidents expressed their full support and firm commitment to the project.

The Center will be coming out with another project of the establishment of the MEICs in the other remaining regions in 2021.

Figure 8. Secretary Fortunato T. Dela Peña, Undersecretary Rowen Cristina L. Guevara, Engr. Robert O. Dizon with the Regional Directors of DOST-CAR, I, II, III and X, and Presidents of IFSU, DMMMSU, CSU, NEUST and USTP during the virtual signing of Memorandum of Agreement (MOA) on December 22, 2020.

C.2.4. Refurbishment of aluminum moulds

The TSSS handled the job requested by the BOSCOLO Manufacturing Corp. For this customer, aluminum moulds for boots are refurbished. Logos from Spartan to Vikings were changed by TIG welding, grinding, machining, laser welding, and polishing processes.

Ready for delivery: Laser-welded aluminum molds of boots with new logos

C.2.6. Foundry services

Despite of the occurrence of the Covid-19 pandemic, the DOST-MIRDC Foundry increased machine utilization by more than 400% catering to clients such as Numen Artspace, Eva Metalcasting, and Mines and Geosciences Bureau, to name a few.

C.2.5. Technical service using wire cutting and CNC machining processes

Reverse engineering of the 50-caliber machine gun from the Philippine Air Force bolt being produced using wirecutting and CNC machining processes.

50 caliber machine gun bolt wire cut for measurement insert and CAD CAM programming

(L) Wax molds being repaired, cleaned and prepared for ceramic coating (R) Wax injection machine on the job producing wax items for investment casting process.

C.3. Industrial Training

The Center continuously fulfills its mandate of supporting the workforce of the metals, engineering, and allied industries by providing training through the expertise of the Center's technical staff. The Industrial Training Section (ITS), with strong leadership and competent staff, delivers its output based on the measurements set on the Section's identified key performance indicators (KPIs). Despite the challenges faced by the country due to the COVID-19 pandemic in 2020, the ITS intensified its efforts to attain the group's set target in the implementation of training programs. The limitation of in person mode of training paved the way to a bigger and wider clientele of the Center's training programs in terms of location and participant's profile (education and experience) with the use of online platform.

Thus, the accomplishments of the ITS in 2020 made a significant contribution to the MIRDC's overall output in response to the needs of the industry and other beneficiaries of the Center's services.

The ITS surpassed the targets set on the Center's clients served and industry people trained. A total of 1,289 (403%) out of 320 target clients (both individual and firm) was achieved. These include new and returning customers. Likewise, a total of 3,114 (255%) out of 1,220 participants were trained. From these, the ITS was able to raise an income of Php 538,800 for the year 2020. A low income generation was due to the cancellation of both regular and packaged programs because of the pandemic situation.

The ITS conducted a total of 105 (131%) out of 80 target training programs both in person and via online platform. As shown in Figure 1, regional training program got the biggest chunk at 92 or 87.6%, while the packaged (7) and regular (6) programs share the remaining 12.4%. Regular and packaged programs are paid trainings that are usually attended by employees of different companies in the metals, engineering, and allied industries, while regional trainings are offered free and cater to diverse clients including students from different regions of the country. Restrictions of face-to-face gatherings, as one of the safety protocols during the pandemic, resulted to the small number of both regular and packaged trainings. However, regional trainings took its peak as webinars were the only activities implemented considering the pandemic situation. The lined-up regular programs were cancelled from the second week of March 2020 up to the end of the year, though there were two regular programs which were implemented online in the last quarter of the year.

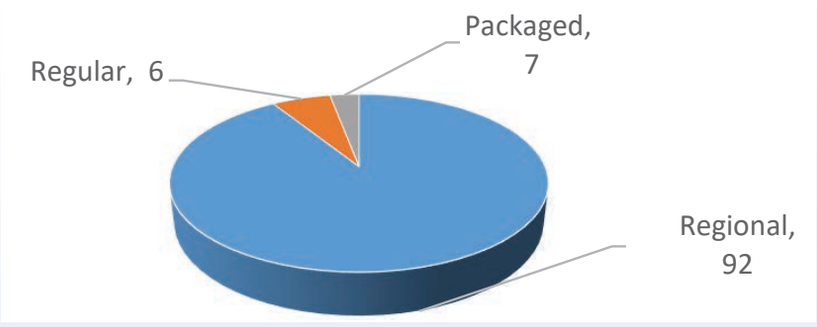


Figure 9. Distribution of Training Programs Conducted in 2020

Table 4. Distribution of Training Programs Conducted According to Area of Expertise and Region

Areas of Expertise/Region	NCR	II	III	VI	CARAGA	TOTAL
Metalworking Technology	70	6	2	1		**79**
Analysis & Testing	11	2				13
Management/Productivity Improvement	2	1				3
Metal Casting Technology	1					1
Others	7				2	9
Total	**91**	**9**	**2**	**1**	**2**	**105**

Table 4 shows that the most number of trainings is in the field of metalworking, which includes welding, die and mold, and machining in both conventional and CNC, among others. The National Capital Region represents the region where majority of the trainings was conducted.

The ITS collaborated with subject matter experts – engineers and other technical experts – in the development of training curricula and the actual conduct of trainings and webinars. Some of these collaborations are:

Anodizing

The webinar curriculum was developed and conducted by Ms. Keziah M. Dela Rama

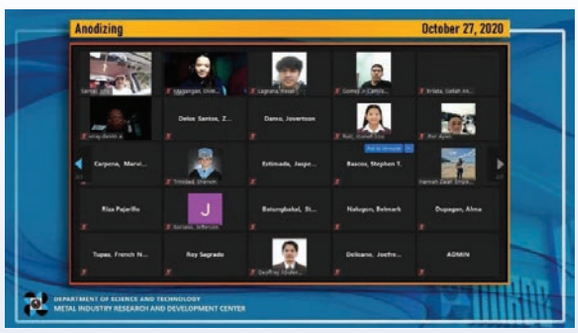
The course outline includes anodizing applications, basics of aluminum alloys and basics of anodizing process. The seminar was attended by 31 participants from 28 client companies, excluding internal attendees from MIRDC.

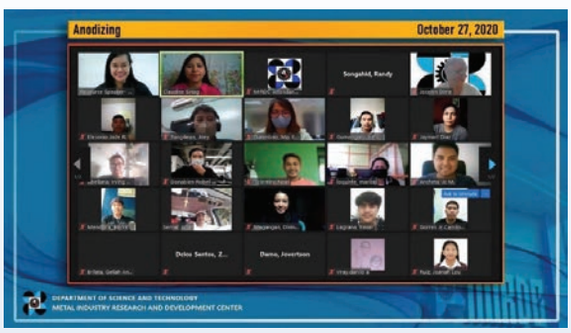
Vacuum Heat Treatment Process

The webinar curriculum was developed and conducted by Engr. Joey G. Pangilinan

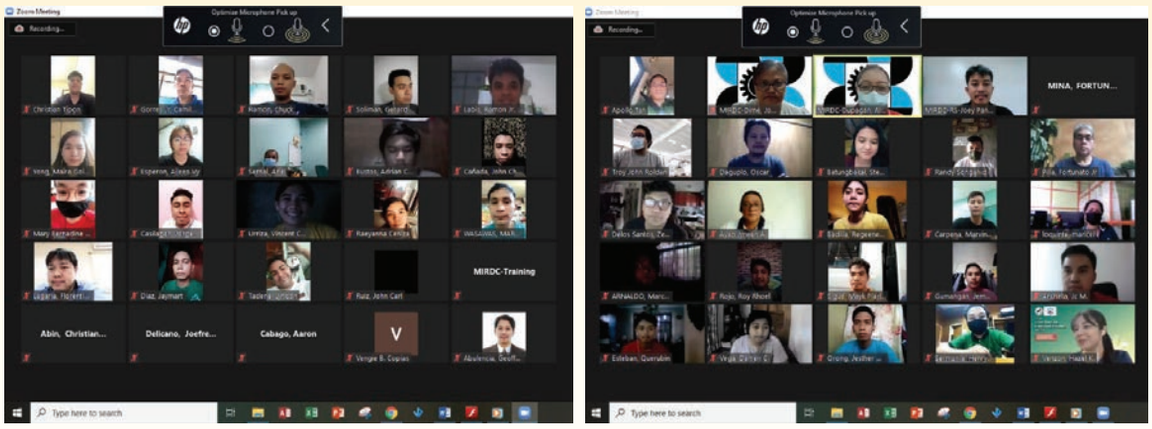
This webinar introduces Vacuum Heat Treatment process, one of the heat treatment services being offered by the MIRDC. The course outline includes general heat treatment principles, basic operation, parts and components. This webinar was attended by 60 participants from 43 client companies, excluding internal attendees from MIRDC.

The ITS continuously strengthen its collaboration with the ATD in the conduct of metrology and calibration training programs. The following experts were tapped in conducting face-to-face and online trainings: Engr. Rommel N. Coroña, Engr. Arlene G. Estacio, Engr. Arvin Yan V. Pacia, Engr. Christine P. Avelino and Engr. Eduardo V. Diasanta, Jr., (assisted by Samuel A. Ysit, Mary Joy R. Baroña, Christian M. Ibañez, Joel A. Eligue, Luisito N. Alcantara and Luis C. Forbes). The ATD experts conducted MIRDC's regular programs on Industrial Calibration, Dimensional Metrology, and Uncertainty of Measurements to support the industry.





Screenshot of participants



Screenshot of participants

The expertise of the ITS in conducting industrial trainings is tapped by various projects teams of the DOST-MIRDC. Below are descriptions of the involvements of the ITS in some projects:

DiMo Guru Phase 2

The ITS group spearheads the BOI-funded project entitled "Capability Building for Enhancing the Competitiveness of Die and Mold Industry Through the Engagement of Local Experts (DiMo Guru) – Phase 2." The project aims to equip the workforce of the metalworking and engineering industries in the area of die and mold design and making. This is in support of the DOST-MIRDC's Die and Mold Solution Center (DMSC), and is a continuing project which started in 2019. For the year 2020, eight (8) remaining training programs were conducted in person with a total of 81 participants, with Die Design program topping the list according to the number of participants as shown in Table 5.

Mold Technology Solution Center (MTSC)

This project seeks to establish the Mold Technology Support Center (MTSC) which will support the expansion of the Philippine die and mold industry by developing human resources for the die and mold companies, and consequently advancing the competitiveness of the country's manufacturing industry. Under this project, the ITS conducted webinars composed of appreciation courses that aim to equip the trainees with knowledge and understanding on die and mold design and process. As presented in Table 6, there is total of 716 participants who attended the nine (9) programs conducted in the second semester of 2020.

Table 5. DiMo Guru – Phase 2 Project Training Programs Conducted

Title of Training	No. of Participants
1. 3-Axis CNC Milling	12
2. CAD/CAM	6
3. CNC Turning	10
4. Conventional (Turning, Milling, Grinding, EDM) with Introduction to CNC Machining	13
5. Die Design	15
6. EDM Sinking	9
7. EDM Wire Cutting	10
8. Mold Design	6
Total	**81**

Table 6. Training Programs Conducted under the Mold Technology Solution Center (MTSC)

Title of Training Program	No. of Participants (External)
1. Technical Drawing (2 batches)	99
2. Technical Drawing Module 2: Flat Angular Work pieces	71
3. Technical Drawing Module 3: Flat Circular Work pieces	54
4. TD Module 4: Introduction to Three-Dimensional Drawing	70
5. Part Design for Mold (2 batches)	108
6. Mold Design Using NX(2 batches)	94
7. Injection Mold Assembly	56
8. Plastic Injection Molding Machine Process	49
9. Introduction to Mold Processing (3 batches)	115
Total	**716**

Table 7. Webiserye on Technical Drawing under the MTSC

Title of Training	No. of Participants
Module 1: Introduction, Lines, & Standards	97
Module 2: Flat Angular Work pieces in One Elevation	68
Module 3: Flat Rounded Work pieces in One Elevation	65
Module 4: Introduction to Three-Dimensional Drawing	80
Module 5: Drawing in Three Elevations	69
Module 6: Work pieces with Concealed Edges	69
Module 7: Cylindrical Work pieces	66
Module 8: Section Through Cylinders Parallel to Rotation Axis	63
Module 9: Full Section	67
Module 10: Half Section-Part Section	57
Module 11: Drawing of Threads	47
Module 12: Screw Bolt Connections	28
Module 13: Tolerances	40
Module 14: Surface Finish	34
Total	**850**

Moreover, the ITS also offered webinars under the Technical Drawing course. These were attended by participants with diverse backgrounds in terms of education and experience, who have interest in the field as shown in Table 7. The series consisted of 14 Modules on Technical Drawing course, called "Webiserye," were conducted from October to December 2020. Participants received a Certificate of Attendance upon completion of every module, while trainees who completed at least ten (10) out of the 14 topics of the whole course received a Certificate of Completion.

Other ITS Project involvement (AMERIAL and MEIC)

The ITS supported other programs of the Center like the Advanced Mechatronics, Robotics and Industrial Automation Laboratory (AMERIAL) and Metals and Engineering Innovation Centers (MEIC) in terms of training. A total of 328 individuals were trained on four batches of "Introduction to Programmable Logic Controllers (PLCs)" under the AMERIAL program, while 21 participants from the DOST- PSTC Cagayan Valley attended the webinar on Value

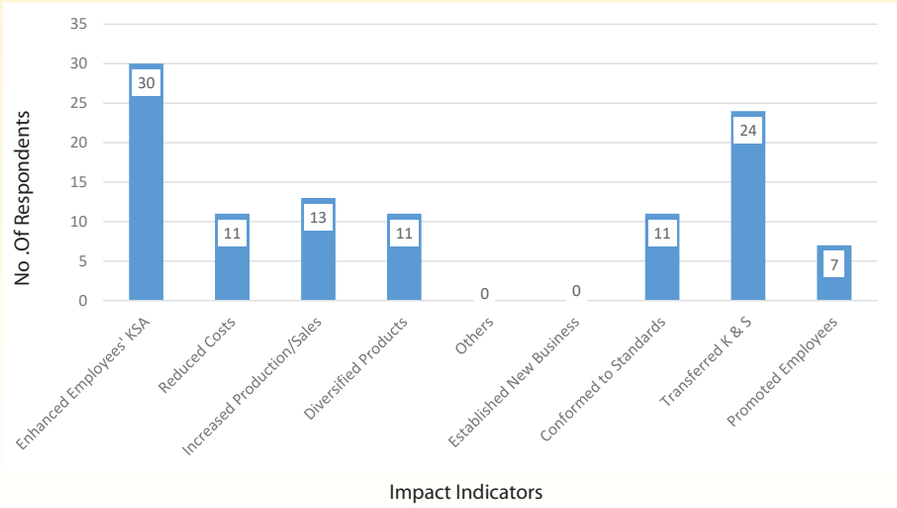


Figure 10. Impact Assessment Survey of Training Programs Conducted January 2020 to March 2020

Analysis/Value Engineering I under the Metals and Engineering Innovation Centers (MEIC) in November.

The scientific and technology services rendered by the ITS group were achieved with the strong support of the different industry associations like the PDMA, Inc., Metalworking Industries Association of the Philippines (MIAP), Mechatronics and Robotics Society of the Philippines (MRSP), and the Philippine Welding Society (PWS).

Corporate Social Responsibility (CSR) and assistance to academe as other output indicator

On top of the ITS's output on science and technology services, we implemented the following training programs as the Center's Corporate Social Responsibility (CSR: (1) Awareness on Risk Management (Based on ISO 31000:2009); (2) Effective Skills for Audit Reporting; (3) Awareness on ISO 9001:2015 Std.; and (4) Internal Quality Audit. A total of 113 individuals were trained for the 4 training programs. CSR training programs are seminars conducted for private, government entities or academic institutions that are not engaged in metals and engineering activities. We also trained twelve (12) college students from eight (8) universities in the National Capital Region who are offering engineering and technology courses.

Impact Assessment of Training Programs

To measure the effectiveness of the training programs implemented by the Center, the ITS conducts an impact assessment every six (6) months after the implementation of training programs. A structured survey questionnaire was designed indicating identified variables as measure on the benefits gained by the training participants, with the trainee's supervisor as the respondents. Figure 10 shows the impacts gained by 30 respondents for the period January to March 2020. Based on the data, majority or 30 responses indicated that their knowledge, skills, and attitudes (KSA) were enhanced, followed by 24 which show that they transferred their knowledge and skills to their work team after attending the seminars. The remaining responses constitute the other variables in measuring the impact of training programs as illustrated in Figure 10.

III. Team MIRDC: Exploiting Opportunities to Support to Reach Shared Goals

(Accomplishments of Support Groups)

'A successful team is a group of many hands but of one mind.'

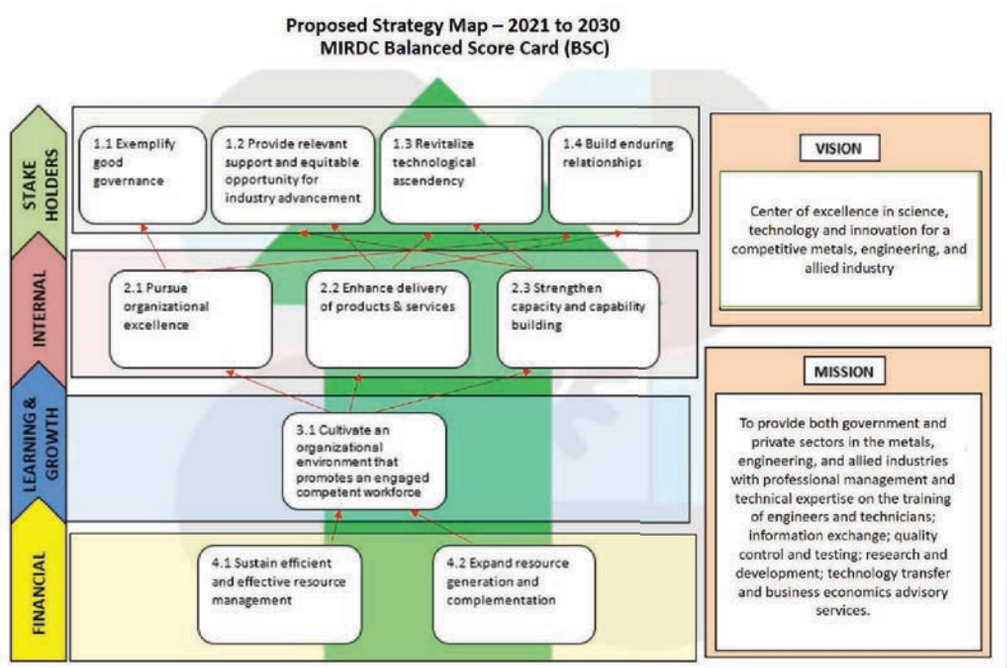
- Bill Bethel

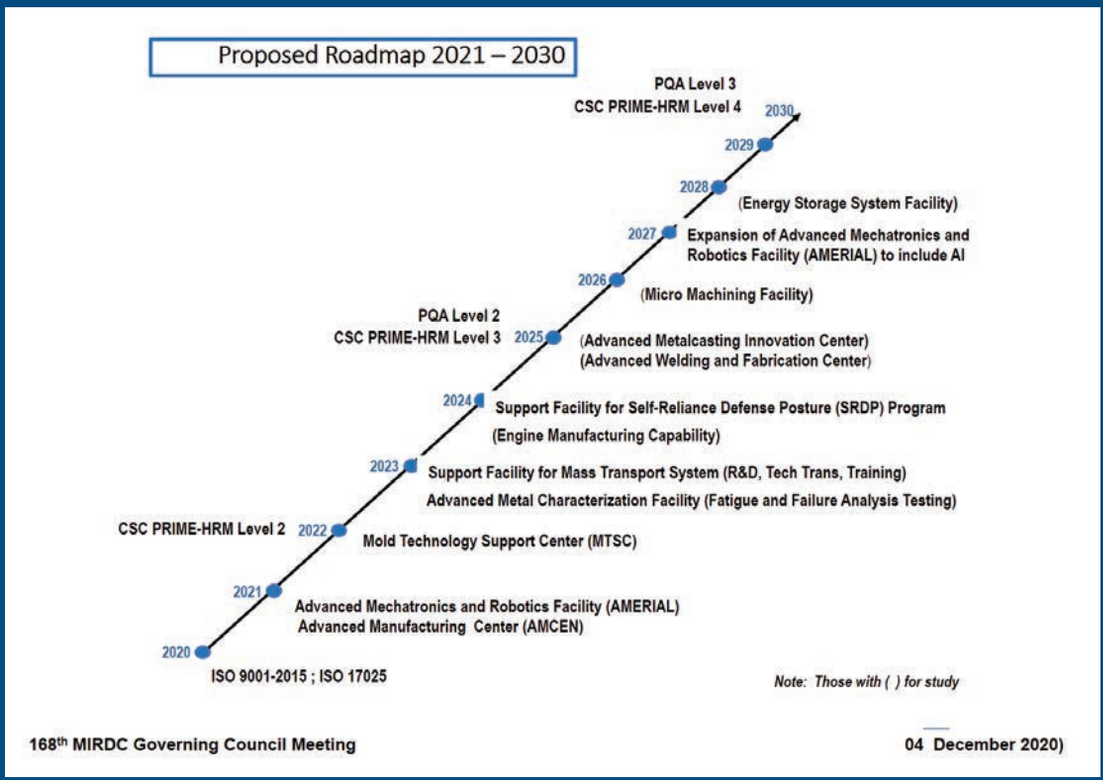
A. Planning and Management Division (PMD)

A.1. Planning and Management Division - Planning and Evaluation Services (PMD-PES)

A.1.1. Strategic Planning

The Center continues to improve its strategic map to ensure that it is aligned with national priorities. Through close collaboration with partners from the government and the metals, engineering, and allied industry under the private sector, the Center sought to outline their ideas and first-hand knowledge of the developmental needs of the metals industry. To better link the Center's strategic map to more relevant requirements of the industry, significant recommendations were gathered from members of the DOST-MIRDC Governing Council to ensure coherence with the Center's future directions.



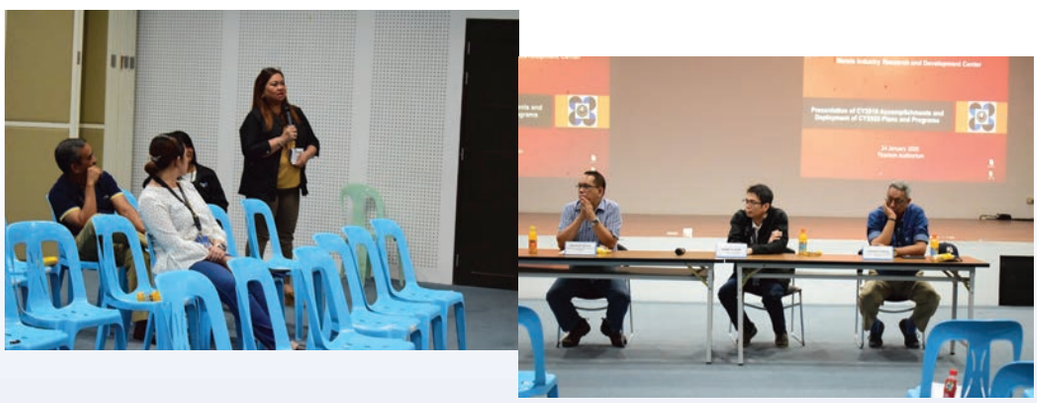


Online Strategic Planning workshops via Zoom platform were carried out from October to November 2020, where the Management Committee meticulously strategized and shared elaborative ideas to accomplish an up to date and more comprehensive strategy map and balanced score card.

With programs and activities anchored on a revolutionary Industry 4.0, we formulated the 2021-2030 roadmap with focus on services and establishment of facilities that will cater to industry partners and stakeholders to further allow them to be in sync with the fast-changing demands of the industry.

A.1.2. 2020 Deployment

Focusing on the highlights of the Center's CY2019 Accomplishments and deployment of CY2020 Plans and Programs, the Center held the deployment session on January 24, 2020 at the MIRDC Titanium Auditorium.



Left: Ms. Lina B. Afable, TDD Chief, during an exchange of information with DOST-MIRDC Top Management (Right). One of the highlights of the deployment activity is the Question and Answer portion where DOST-MIRDC Mancom addresses issues and concerns raised by employees.

A.1.3. Planning Sessions

Amidst the pandemic, the PMD was able to conduct two online planning sessions. The Mid-year Review and Planning was held on June 5, 2020, while the Year-end Review and Planning was held on December 10-11, 2020 via Skype and Zoom platforms. These planning sessions focused on the Center's consolidated accomplishments for PREXC and other selected Key Performance Indicators (KPIs), and details of plans and targets for the updated performance indicators for 2021 as well as recommendations on PPAs.

A.2. Planning and Management Division - Management Information System (PMD-MIS)

The PMD-MIS further improved technical support and intensified the development of information systems, especially as the Center transitions to the new normal, to assist DOST-MIRDC personnel, clients, industry partners, and stakeholders.

Development of information systems vital to support operation of the Center

Pursuant to the Center's strategic objective to enhance delivery of products and services, the MIS developed the following information systems for CY2020 that adhere to the group's goal which is to strengthen ICT Infrastructure and Information Systems requirements.

A.2.1. Technology Management Information System (TechMIS)

The TechMIS is a web-based and access-controlled information system that provides a centralized repository of information for DOST-MIRDC developed technologies, intellectual properties, scientific papers, and technology transfer activities. The system was also designed to manage and monitor the status of IP and technology transfer activities of the Center. It has a dashboard that visually tracks, Analyzes, and displays key performance indicators (KPI) and shows accurate and on-time technology-related statistics and reports.

A.2.2. Knowledge Resources (K-Resources) System

The K-Resources is a web-based and access-controlled information system that provides a centralized repository of relevant information but not limited to books, articles, research papers, references, methods, and manuals related to metals. It has a database of metalworking companies gathered from the industry surveys conducted. The system was also designed to manage files, folders, and records. It has Form Builder feature to build electronic form as a tool to collect data and generate analytic report.

A.2.3. Performance Measure Database (PMDbase)

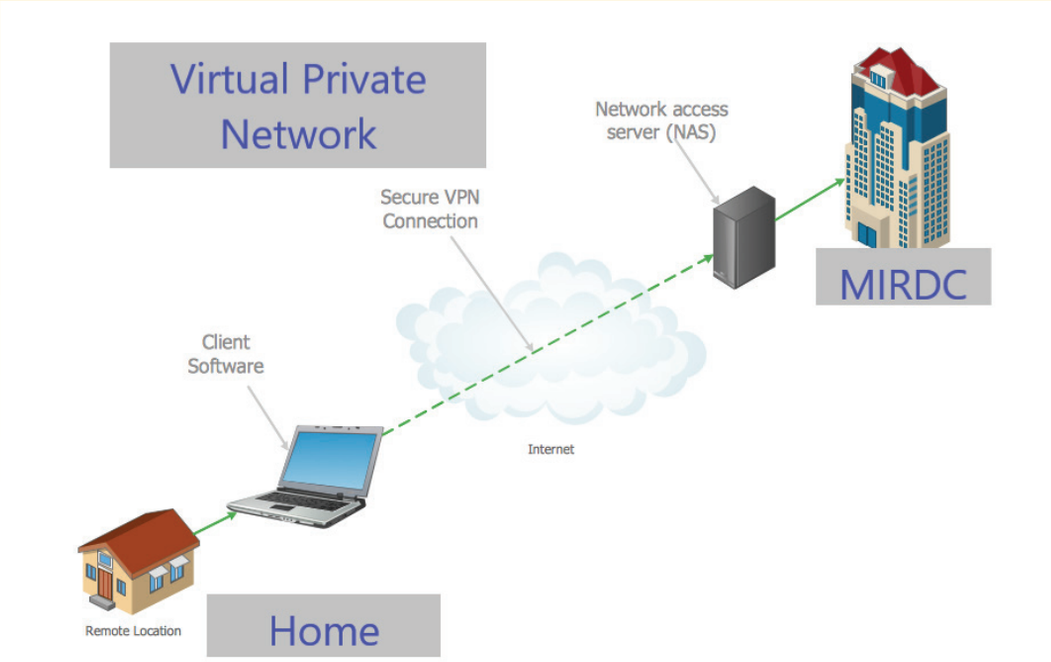
The Performance Measures Database is a web-based and access-controlled database system that serves as the central repository for the key performance indicators of the DOST-MIRDC. The database is designed to house the data needed to complete the key performance indicators which is gathered from the different delivery units and summarized by the PMD. It includes dashboard management tool that visually tracks, analyzes, and displays key performance indicators (KPI).

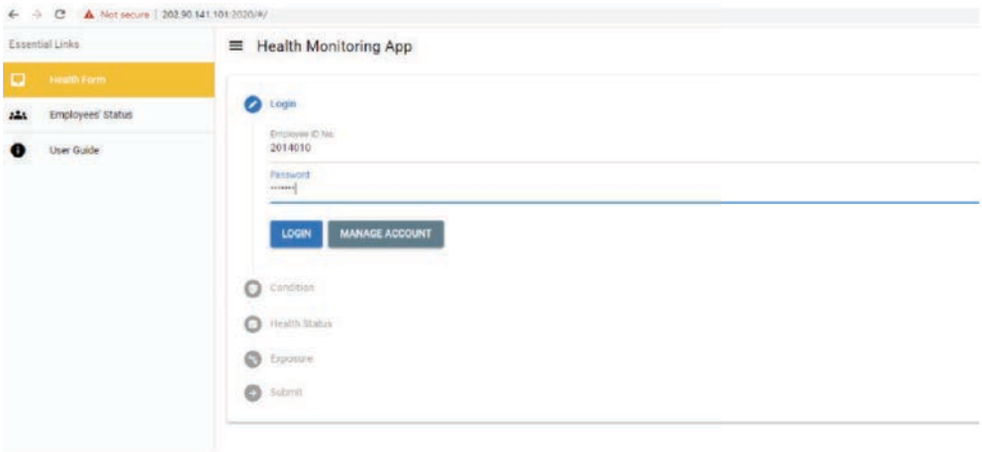
Prior to its implementation, the aforementioned information systems developed are still being tested along with other developed information systems such as:

- Online Training Reservation System (OTRS)
- Human Resource and Payroll Management System (HRPMS)
- Computerized Maintenance Management System version 2 (CMMS v2)
- Web-based IT Help Desk System

Additionally, development of the following information systems is also ongoing:

- Document Tracking System (DTS)
- Property (Inventory) System
- Budget Management Information System (BMIS)

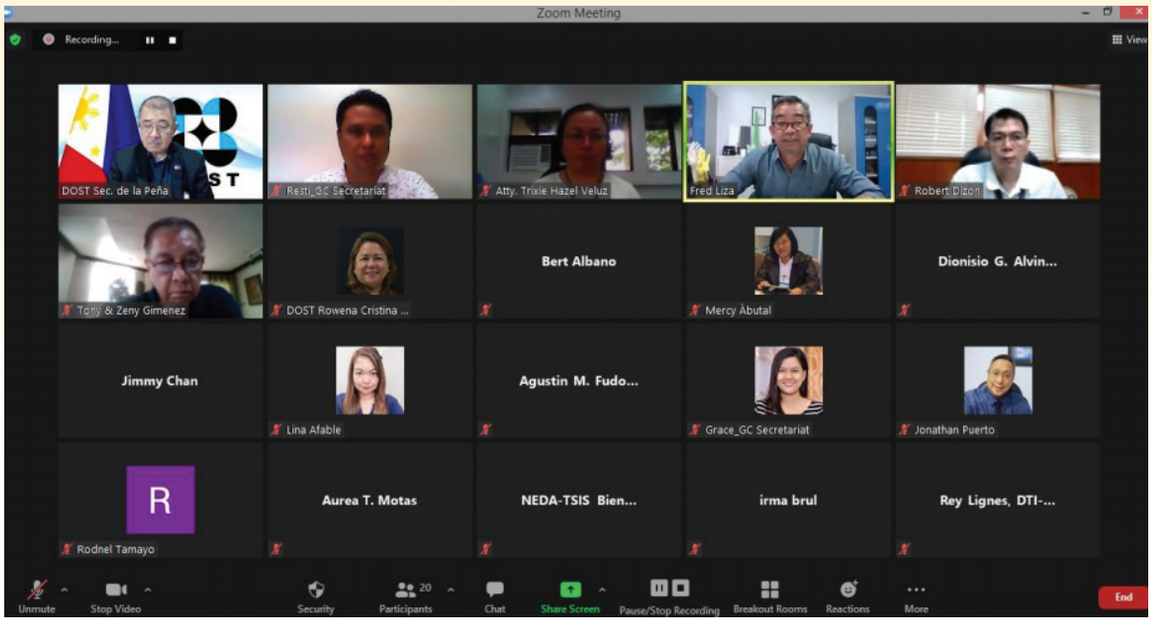




During the quarantine situation, the Center moved to support the work from home setup. As such, the MIS likewise developed an online system for daily time record (DTR) which was implemented last May 2020. This enabled DOST-MIRDC employees to remotely time/log in or out as required by the Civil Service Commission (CSC).

In response to the unforeseen circumstances brought about by the Covid-19 pandemic, other initiatives of the PMD-MIS include: Virtual Private Network – implemented last April 2020 to enable employees/users outside of the office (e.g. work-from-home) to connect to the DOST-MIRDC Intranet and access files or the systems. A total of 146 VPN accounts were created for DOST-MIRDC employees.

- **eHealth Monitoring App –** online application for employees to monitor Covid related risks or symptoms in compliance with reference to POL-MIRDC 027 Revision 1 "Interim Guidelines for Alternative Work Arrangements, Support Mechanisms and Workplace Prevention and Control during the Period of State of National Emergency due to COVID-19 Pandemic."



• **Zoom subscription –** MITHI funds were used for the subscription of three (3) zoom accounts for online meetings, webinars, etc. which were utilized by BAC in conducting bidding-related activities, continuous training programs of both FAD-SDU and TDD-ITS, ManCom meetings, and other online activities.

• **E-Signatures –** Digital or electronic signatures have been adopted in the PMIS in order to facilitate faster approval;

A draft policy for e-signatures was prepared and PMD-MIS has facilitated the application of digital signatures to the DICT PNPKI for possible deployment and implementation.

• Subscription to Adobe Acrobat was provided to ManCom Members in order to facilitate management and approval of PDF files

For CY 2020, funds were used to procure a Business Continuity and Disaster Recovery System, 20 additional desktop computers, 14 laptops, and a Network Vulnerability Assessment / Scanner. The acquisition of the ICT equipment assures compliance to the requirements of Information Security Management System (ISMS).

Upgrading of the Center's ICT Infrastructure helped ensure that DOST-MIRDC personnel are equipped in order to perform their tasks. Such upgrading proved crucial in order to avoid hampered operations during the pandemic. DOST-MIRDC personnel who were in work-from-home arrangements were able to utilize their laptops, and even desktops for some employees. The laptops/ desktops have updated operating system, licensed Microsoft Office and protected by BitDefender Anti Virus.

B. Finance and Administrative Division (FAD)

B.1. DOST-MIRDC Human Capital

The Center has a total of 220 technical and non-technical filled up positions by the end of 2020. This created a 96.49% sustained human resource based from its 228 approved plantilla positions, with a 2.19% increase from last year. This also included several manpower movements that resulted to the conferment of eight (8) newly hired personnel, three (3) promoted staff, and three (3) employees separated from government service.

Currently, the Center employs a total of 148 technical and 72 non-technical personnel under the three (3) directorates of the Center, namely: Office of the Executive Director (OED), Research and Development (R&D), and Technical Services (TS). The manpower is broken down as follows:

Table 8. Number of employees in each divisions

		Research and Development			Technical Services		
	OED	MPRD	PD	PMD	ATD	TDD	FAD
Engineers	3	12	17	0	9	14	3
Non-Engineers (Technical)	1	22	29	13	25	0	0
Admin/Support/Non-Technical	2	2	4	5	3	16	40
TOTAL	6	36	50	18	37	30	43

The Center sincerely extends its warm welcome and congratulations to these successful newly-hired and promoted personnel:

B.1.1. New Personnel

Meyce A. Morales
Senior Administrative Assistant I
Finance and Administrative Division

Eleno F. Dalida
Metals Technologist III
Prototyping Division

Clarizel G. Lopez
Administrative Assistant I
Planning and Management Division

Paul John V. Luna
Metals Technologist I
Materials and Process Research Division

Schatzly Kai B. Dolorfo
Administrative Assistant I
Prototyping Division

Ulysses B. Ante
Senior Science Research Specialist
Materials and Process Research Division

David J. Santos
Laboratory Technician I
Analysis and Testing Division

Al Lois G. Tuesca
Draftsman II
Prototyping Division

B.1.2. Promoted Personnel

Tracy Ann U. Tolentino
Administrative Assistant V
Technology Diffusion Division

Genevieve M. Barsales
Administrative Officer I
Technology Diffusion Division

Zalda R. Gayahan
Supervising Science Research Specialist
Technology Diffusion Division

As the new generation of DOST-MIRDC personnel venture into the beginning of their appointment, there are some who have reached the summit of their public service and started to delve into their own personal endeavor. The Center duly recognizes the valuable contribution of its outgoing personnel during their length of service:

B.1.3. Retirees

Rebecca C. Jabson
Administrative Assistant III
Finance and Administrative Division
39 Years - March 25, 2020

Vilma A. Sia
Administrative Officer IV
Technology Diffusion Division
42 Years - December 31, 2020

B.1.4. In Memoriam

Amidst these tributes, the Center grieved the loss of its employee, Mr. Ruben L. Sepagan, Administrative Assistant V of the Technical Solution Services Section (TSSS) last May 23, 2020, who rendered 42 years of service.

B.2. Moving Towards a Digital Learning and Development Platform

Over the years, the Center was able to enhance its personnel development initiatives through local and foreign trainings as well as graduate degree programs to boost employees' competence to improve productivity and to promote personal and professional growth.

For the year 2020, despite the challenges brought about by the COVID-19 pandemic, a total of 22 programs were successfully implemented which resulted to a 91.67% accomplishment of the 24 target Annual Learning and Development Plan programs.

Table 8.1. Annual Learning and Development Programs for CY 2020

	Program Description	Type	No.of Pax	Participants Office/Division	Provider	Date Implemented
I. TECHNICAL						
1	Basic NDT	Internal	3	ATD	ITS	March 2-6, 2020
2	MS Excel Basic Course*	e-learning/External	4	TDD/OED/FAD/ATD		March 25-27, 2020
3	MS Powerpoint Basic Course	e-learning/External	4	ATD/OED/FAD		April 1-3, 2000
4	Webinar on Calibration of Electronic Non-Automatic Weighing Instrument (NAW) Laboratory Scales	Webninar/Internal	19	PD/ATD	Myro Jon Baroña, MIRDC	Aug 17, 2020
5	Formlabs Form 2 Training	Webinar/In-house	6	MPRD/TSSS	MIRDC	Sept 17, 2020
6	Ultimaker S5 Training	Webinar/In-house	4	MPRD/TSSS	MIRDC	Sept 18, 2020
7	Hyrel Hydra 16A Webinar	Webinar/In-house	6	MPRD/TSSS	MIRDC	Sept 22, 2020
8	Intamsys Funmat 410 On-line/On-site Training	Webinar/In-house	7	MPRD/TSSS	MIRDC	October 15, 2020
9	Virtual Training on Information System Audit Fundamentals	Webinar/External	4	PMD	AGIA	Nov 23-26, 2020
10	Webinar on RA 9184 Procurement Law and Revised IRR	Webinar/In-house	26	ODEDTS/TSSS/PMD/FAD/PD/TDD	Atty. Lawrence P. Villanueva, GPPB	November 25, 2020
11	Failure Analysis	Mixed/In-house	10	ATD/TSSS/MPRD	RRufino	March 11-Dec 10, 2020
12	Calibration of Gauge Block	Face to Face/In-house	4	ATD	MESCO	December 2020
II. NON-TECHNICAL						
Total Quality Management						
13	Environmental Management System (ISO 14001:2015)	Internal	25	ATD/FAD/MPRD/PD/TSS/PMD	Gina A. Catalan	February 5, 2020
14	E IMIS Orientation	Intenal	28		QMR/Trinmar A. Boado	24 Feb Batch 1/Batch 2
15	Awareness Seminar on PNS 49:2002, PNS 211:2002 and PNS 657:2008	Webninar/Internal		PD/ATD	Florante A Catalan, MIRDC	Jul 16, 2020
16	E-Learning Seminar on IQA ISO/IEC 17025:2017 Standard	Webninar/Internal	10	PD/ATD	MIRDC	Aug 4, 2020
Managerial/Supervisory						
17	Trainer's Training Program I: Basic Presentation Skills	Internal	10	ATD/PD/MPRD/TDD	Jocelyn F. Dime/C. Cortez	February 19-21, 2020
18	Virtual Training on Performance Management	Webinar/External		FAD/PMD	PAGASA-DOST	Sept 7-8, 2020
19	Strategic and Operational Planning Virtual Training	Webinar/External	3	PMD	AGIA	Oct 12-15, 2020
20	Operations and Management Audit Virtual Training	Webinar/External	4	PMD	AGIA	Oct 20-23, 2020
21	Webinar on How to Develop a Data Privacy Management System & Manual	Webinar/External	2	PMD/OED	Center for Global Best Practices Fdtn., Inc.	Nov 25-26, 2020
22	Business Process Streamlining	Webinar/External	2	PMD	DAP	Dec 1-4, 2020

On top of these, a total of 72 programs were also implemented as shown below which resulted to a 392% accomplishment over target:

Table 8.2. Annual Learning and Development Programs (Technical) for CY 2020

	Program Description	Type	Participants Office/Division	Provider	Date Implemented/ REMARKS
I. TECHNICAL					
1	Automation Studio Training	Internal	PD	Edmund V. Guzman	January 7,9,28,30 - February 11, 2020
2	Training /Writeshop on IP Valuation	External	TDD-TABDS	TAPI	Jan. 16-17, 2020
3	Basic Cohort 2 Module 2	external	TDD-TABDS		Jan. 29-31, 2020
4	6-Axis Collaborative Robot Operation and Maintenance Training	Internal	PD	Yves A. Lacayañga	February 17-18, 2020
5	Echo Seminar on Uncertainty of Measurement for Chemical Analysis	Internal	ATD	Jo Marie Venus T. Agad	February 28, 2020
6	Echo Seminar Method Validation for Chemical Analysis	Internal	ATD	Morris DR. Pioquinto	February 28, 2020
7	Training on the Operations and Maintenance of a Smart Factory Training System through an E-Learning System	Foreign	PD	Hytec Power, Inc. Philippines	March 3-7, 2020
8	Method Validation*	e-learning/Internal	ATD	Morris DR. Pioquinto	April 13-14, 2020
9	Uncertainty of Measurement, Top Down Method*	e-learning/Internal	ATD	Jo Marie Venus T. Agad	April 13-14, 2020
10	Basic Training on Materialise Software*	e-learning/External	MIS/TDD/MPRD	Mun Chun Lim/Clement Lee	April 15, 2020
11	Design for Additive Manufactruing w/o Expert Knowledge*	e-learning/External	MIS/MPRD/ TDD	Indo Pacific MSC SoftwARE Inc.	April 22, 2020
12	IEEE Xplore and Beyond in 7 Weeks: Search, Research, Publish and More...*	e-learning/External	ATD	Institute for Electrical and Electronics Engineers	April 28 to June 22, 2020
13	Introduction to Humidity Measurement*	e-learning/Internal	ATD	Rommel N. Coroña/Christine P. Avelino	May 7-9, 2020
14	Quality Control Chart for Analytical Processes*	e-learning/Internal	ATD	Gina A. Catalan	May 14-15, 2020
15	Solutionix C500 Table Top Scanner Training*	Webinar/In-house	MPRD	RAPPID-ADMATEC	June 5, 2020
16	Artec Eva 3D Scanner On-site Training*	Webinar/In-house	MPRD	RAPPID-ADMATEC	June 5, 2020
17	Introduction to Digimat AM Software*	Webinar/In-house	MPRD	Soumik Chakrabarty	June 10-11, 2020
18	MSC Apex Generative Design*	Webinar/In-house	MPRD	RAPPID-ADMATEC	June 15, 2020
19	Tower Printer Leapfrog*	Webinar/In-house	MPRD	NORDE Intl	June 19, 2020
20	EOS M290 Basic Machine Operation Training *	Webinar/In-house	MPRD	EOS	June 22-23, 2020
21	Training on Predicting the Future with Artificial Neural Networks and Deep Learning (Data Science Series 2) (Online)	Webinar/External	PMD/MPRD	ITDI-DOST	Jun 16 & Jul 7, 2020
22	NAST Webinar Series (IC-20-0720-01)	Webinar/External	FAD	NAST-DOST	Jul 22, 2020
23	ERECTORBOT Introduction	Webinar/In-house	MPRD/AMCEN	AMCEN	August 13-14, 2020
24	Webinar on Technical Drawing Module 2: Flat Angular Workpieces	Webninar/Internal	MPRD/TSSS	MIRDC-ITS	Sept 9, 2020
25	Webinar on Introduction to Programmable Logic Controllers	Webninar/Internal	ATD/MPRD	MIRDC-ITS	Sept 9, 2020
26	Technical Drawing Module 3 Flat Circular Workpiece	Internal	ATD/TSSS	ITS	September 16, 2020
27	Technical Drawing Webinar (Batch 1)	Webninar/Internal	MPRD/TSSS	MIRDC	Sept 23, 2020
28	Mold Design Using NX Webinar	Webninar/Internal	MPRD/TSSS	MIRDC	Sept 24, 2020
29	Technical Drawing: Introduction to Three Dimensional Drawing Webinar	Webninar/Internal	MPRD/TSSS	MIRDC	Sept 29, 2020
30	Technical Drawing Webinar (Batch 2)	Webninar/Internal	TSSS	MIRDC	Sept 30, 2020
31	Mold Assembly Webinar	Webninar/Internal	MPRD	MIRDC	October 6, 2020
32	Plastic Injection Molding Machine Process Webinar	Webninar/Internal	MPRD/TSSS	MIRDC	October 8, 2020
33	Online Semnar on Basic CMM Operation (Batch 1 & 2)	Webninar/Internal	TSSS	TDD-ITS	OCtober 14, 2020 and October 21, 2020
34	Webinar on Aluminum Anodizing	Webninar/Internal	MPRD/TSSS	TDD-ITS	October 17, 2020
35	Online Semnar on Basic CMM Operation (Batch 2)	Webninar/Internal	TSSS	TDD-ITS	October 21, 2020
36	Webinar on Programmable Logic Control (PLC)	Webninar/Internal	TSSS	TDD-ITS	October 23, 2020
37	Webinar on Machine Shop Operations	Webninar/Internal	TSSS	TDD-ITS	October 23, 2020
38	Webinar on Technical Drawing Module I - Introduction to Lines and Standard Lettering	Webninar/Internal	TSSS	TDD-ITS	October 28, 2020
39	Webinar on Mold Processing (Batch 1)	Webninar/Internal	TSSS	TDD-ITS	October 28, 2020
40	Webinar on Vacuum Heat Treatment	Webninar/Internal	MPRD/TSSS	TDD-ITS	October 29, 2020
41	Online Training on Module 4 of the KTTO Impact Workshop	Webinar/External	TDD	External	Oct 29-30 to Nov 4-6, 2020
42	Introduction to the Phased Array Ultrasonic Testing Webinar	Webninar/Internal	ATD	TDD-ITS	November 9, 2020
43	Gigabot X Training	Webninar/Internal	MPRD/AMCEN	Formlab	November 27, 2020

Table 8.3. Annual Learning and Development Programs (Non-Technical) for CY 2020

	Program Description	Type	Participants Office/Division	Provider	Date Implemented/ REMARKS
II. NON-TECHNICAL					
Total Quality Management					
44	Technical Risk Management for Product Development Projects	Webninar/Internal	TDD/TSSS/PD/M TSC/MPRD	Lemuel N. Apusaga, MIRDC	June 25,29, Jul 1,2,6 & 8, 2020
45	Awareness Seminar on PNS 49:2002, PNS 211:2002 and PNS 657:2008	Webninar/Internal	PD/ATD	Florante A. Catalan, MIRDC	Jul 16, 2020
46	Webinar on Basic Occupational Safety and Health Training (BOSH) for Government Workers	Webinar/External	ATD/FAD	DOLE	Sep 14-18, 2020
47	Webinar on Basic Occupational Safety and Health Training (BOSH) for Government Workers	Webinar/External	ATD/FAD	DOLE	Sept 28-Oct 2, 2020
48	Online Orientation on Root Cause Analysis	Webninar/Internal	MPRD	Linda G. Rivera, MIRDC	November 13, 2020
49	Awareness Webinar on IQA ISO/IEC 17025:2017 Standard	Webninar/Internal	ATD	Rodnel O. Tamayo, MIRDC	November 23, 2020
	Subtotal				
Managerial/Supervisory					
50	Virtual Training on Performance Management	Webinar/External	FAD/PMD	PAGASA-DOST	Sept 7-8, 2020
Information Advocacy					
51	Privacy by Design for the Next Billion and Towards a Human Rights-Based Approach to Artificial Intelligence (AI)**	e Learning/External	MIS	United Nation University, Macau	March
52	International Conference on Data Protection and Privacy	e Learning/External	PMD-MIS		March 26, 2020
53	Public Sector Productivity: An Introduction*	e Learning/External	OED/TDD	DAP	April 3, 2020
54	5S in the Workplace: Organizing for Greater Public Sector Productivity	e Learning/External	OED/ATD	DAP/Nina Estudillo	April 17, 2020
55	Designing for Public Good: Design Thinking for the Public Sector*	e Learning/External	OED/ATD	DAP/Phil Smithson	April 24, 2020
56	Public Sector Innovation Lab Masterclass; Innovation for a Futuristic Govt.*	e Learning/External	OED/ATD	DAP/M. Barbecho	May 1, 2020
57	Advanced Level Engineers for Young Engineers**	e Learning/External	MPRD	PSME	May 5, 2020
58	Basic Additive Mfg and Tomography Process in Multiphase Flow for Medical Application**	e Learning/External	MPRD	PSME	May 5, 2020
59	Data Security & PKI towards the New Normal**	e Learning/External	PMD	DICT	May 15, 2020
60	Basics of Videography**	e Learning/External	OED	PressStart Studio	May 19, 2020
61	English Grammar and Writing**	e Learning/External	OED	PressStart Studio	May 21, 2020
62	Personal Development**	e Learning/External	OED	PressStart Studio	May 22, 2020
63	Get it Right: Protecting your Art with Intellectual Property Rights **	e Learning/External	OED	CCP	May 27, 2020
64	Ako at ang COVID 19: Ang nakatagong Pandemya ng Karahasan Laban sa Kababaihan*	e Learning/External	ATD	PCHRD	June 17, 2020
65	Webinar: Gender-Fair Language	Webinar/External	FAD	fora.ph	Aug 4, 2020
66	Webinar: Gender-Fair Language	Webinar/External	FAD	fora.ph	Aug 19, 2020
67	2020 FOI Receiving Officers' Hangout	Webinar/External	OED	FOI-PMO	Sept 25, 2020
68	Webinar on Basic of Gender Mainstreaming, Gender Sensitivity Orientation and Harmonized Gender and Development Guidelines	Webinar/External	FAD/MPRD/ TSSS	TAPI-DOST	October 22, 2020
69	GSIS Pre-Retirement Seminar	Webinar/In-House	TSS/TDD/ MPRD/FAD	GSIS	Dec 8, 2020
70	18-Day Campaign to End VAW: Online Orientation of the Safe Spaces Act	Webinar/External	FAD	DOST	Dec 7, 2020
71	Harmonized Gender & Development Guidelines	Webinar/External	MPRD/FAD/ TSSS	DOST TAPI	Dec 10, 2020
Non-Training Gathering					
72	MIRDC Virtual Thanksgiving (Munting Saya sa Panahon ng Pandemya)		All Divisions	MIRDC	December 14, 2020

LEGEND

**programs under the Alternative HR L&D Programs via e Learning*
*** not included in the Alternative Learning and Development Announcement*

A total of 202 employees were able to participate in the Center's Annual Learning and Development programs, both in training and non-training gatherings. This resulted to a 91.82% of the 220 total workforce who were trained as of 31 December 2020.

Table 9. Status of Annual Learning and Development Programs for CY 2020

I. PROGRAM

A. Target vs Actual	Target	Actual	% Implemented
Technical	14	56	400%
Non-Technical	10	38	380%
Non-Training Gatherings	0	1	
TOTAL	**24**	**95**	**395.83%**

B. Target vs Actual (per ALDP)	Target	Actual	% Implemented per ALDP
Technical	14	13	92.86%
Non-Technical	10	9	90%
Non-Training Gatherings	-	-	-
TOTAL	**24**	**22**	**91.67%**

C. Target vs Unplanned	Target	Alt HR L&D	Addl.+Unpl.	Total
Technical	14	7	36	43
Non-Technical	10	6	22	28
Non-Training Gatherings	-	-	1	1
TOTAL	**24**	**13**	**59**	**72**

D. Target vs Unmet Target	Target	Actual	Balance	% Unmet
Technical	14	13	1	7.14%
Non-Technical	10	9	1	10.00%
Non-Training Gatherings	-		-	-
TOTAL	**24**	**22**	**2**	**8.33%**

II. PARTICIPANT

A. Target vs Actual	Target	Actual	% Trained
Technical	134	310	231.34%
Non-Technical	97	212	218.56%
Non-Training Gatherings	-	189	-
TOTAL	**231**	**711**	**307.79%**

B. Actual vs Unplanned	Target	Actual	Alt	Addl.+Unpl.
Technical	134	98	38	174
Non-Technical	97	86	13	132
Non-Training Gatherings	-	-	-	189
TOTAL	**231**	**184**	**51**	**495**

C. Target vs Unmet Target	Target	Actual	Balance	% Unmet
Technical	134	98	36	26.87%
Non-Technical	97	86	11	11.34%
Non-Training Gatherings	-	-	-	
TOTAL	**231**	**184**	**47**	**20.35%**

D. No. of Participants in Learning Opportunities (single-count):

Classification	No. of Employees Trained	Total No. of MIRDC Employees	Balance	% Accomplished
Technical/Non-Techical/Non-Training	202	220	18	**91.82%**

The FAD-AGSS Staff Development Unit was able to cope with the "New Normal" set-up of its learning and development activities through the utilization of the digital platform. All related processes were improved in line with the requirements of the documented Quality Management System (QMS) and the E-Learning activities being adopted by the Center.

Because of pressing and continuing challenges being encountered during the pandemic, the FAD-AGSS continually evaluates and evolves its processes on the ground of the changing business/operation requirements.

B.3. Scholarship Program

With the impact of the COVID-19 pandemic, scholarship programs were slightly hampered as our scholars were temporarily prevented to attend classes in line with the Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF) advisory. Nevertheless, the Center has produced another Master's degree holder in the name of Louren Joy G. Asmando of the ATD. Table 3 shows the detailed Summary of On-Going Scholarship Programs CY 2020:

Table 10. Scholarship Program Grantees for CY 2020

Name of Scholar		Program/Course	Duration of Contract	School/ University	Type of Scholarship	Scholarship Status	Grantor
I. Doctorate Degree Program							
1	Estacio, Arlene G.	Doctor of Philosophy in Electronics Engineering	SY 2015, 2nd Qtr – 2018; On extension until 2021	Mapua Institute of Technology	Full Time / Local	On-going	DOST-HRDP
2	Rogelio, Jayson P.	Ph.D. in Electronics and Communications Engineering	3rd Term 2018-2019 to 2nd Term AY2020-2021	De La Salle University	Full Time / Local	On-going	DOST-HRDP

(Scholarship Program Grantees continued)

	Name of Scholar	Program/Course	Duration of Contract	School/ University	Type of Scholarship	Scholarship Status	Grantor
II. Master's Degree Program							
1	Bautista, Mary Joy M.	Master of Science in Chemistry	1st Sem AY2016-2017 to 2nd Sem AY2019-2020; on extension until 2021	University of Santo Tomas	Part Time / Local	On-going	DOST-HRDP
2	Bedis, Sheena S.	Master of Arts in Economics	Jun 2015 - Aug. 2017; on extension	Polytechnic University of the Philippines Manila	Full Time / Local	On-going	DOST-HRDP
3	Boado, Trinmar A.	Master in Business Analytics (Off Campus)	Started Aug. 2019	Mapua University (Off Campus)	Full Time / Local	On-going	DOST-HRDP
4	Cabral, Maria Alicia B.	MPM/MPA (Off Campus)	Aug 2018-Jan 2020	Ateneo de Manila University	Full Time / Local	On-going	DOST-HRDP
5	Ibañez, Christian M.	Master of Science in Electrical Engineering	1st Sem 2016-2017 to 1st Sem 2017-2018	Technological University of the Philippines	Part Time / Local	On-going	DOST-HRDP
6	Luces, Joein L.	Master of Science in Mechanical Engineering	Jan 2016 - Dec 2020	Mapua Institute of Technology	Part Time / Local	On-going	DOST-HRDP
7	Marquez, Adonis T.	Master of Science in Engineering Management	1st Qtr AY2018-2019 to 4th Qtr AY2019-2020	Mapua University	Full Time / Local	On-going	DOST-HRDP
8	Viernes, Mildred V.	Master of Information Technology	SY 2nd Sem/Nov 2010 - Mar 2013 (2.5 yrs)	University of the Philippines Los Baños	Full Time / Local (Residential)	On extension	ASTHRDP (DOST-SEI)

(Scholarship Program Grantees continued)

Name of Scholar		Program/Course	Duration of Contract	School/ University	Type of Scholarship	Scholarship Status	Grantor
III. Graduated Scholar							
1	Asmando, Louren Joy G.	Master of Technology	Nov 2015 - Oct 2017	Technological University of the Philippines Manila	Full Time / Local	Graduated	DOST-HRDP
IV. Scholarship Nominations							
1	Gabuya, Restituto Felipe R.	MPM/MPA (Off Campus)		Ateneo de Manila University	Full Time / Local		DOST-HRDP
2	Llanto Katherine T.						

B.3.1. Foreign Program

In line with the directives of the DOST and IATF advisory, foreign travels were put in abeyance for the safety of our employees who were scheduled to travel abroad. Prior to the pandemic, the Center, through the DOST-GIA project "Establishment of the Advanced Mechatronics, Robotics and Industrial Automation Laboratory (AMERIAL) in Support of the Metals and Engineering Industry," was able to send five (5) official and employees abroad to attend to official business. Table 11 shows the detailed Summary of Foreign Travel for CY 2020

Table 11. List of Foreign Travel for CY 2020

Name of Participants		Title of Program	Date Conducted		Venue	Sponsor	Classification	Nature
			From	To				
1	Dizon, Robert O.	Pre-delivery inspection and other by-off activities for the procurement of one (1) lot of advanced automation system (ready for Industry 4.0/Smart Factory) which will include product discussion and future industry partnership	03/03/2020	03/07/2020	United States of America	DOST-GIA Project AMERIAL & Hytec Power, Inc. Philippines	Technical	Pre-delivery inspection/ Meeting/ Networking

(List of Foreign Travel continued)

Name of Participants		Title of Program	Date Conducted		Venue	Sponsor	Classification	Nature
			From	To				
2	Libao, Franz Josep h D.	Training on the Operations and Maintenance of a Smart Factory Training System through an E-Learning System	03/03/2020	03/07/2020	United States of America	DOST-GIA Project AMERIAL & Hytec Power, Inc. Philippines	Technical	Training
3	Alamon, Ronie S.							
4	Luces, Joein L.							
5	Espeña, Glen D.							

B.3.2. Health and Welfare Programs

A Call for Solidarity in Time of Calamity

On January 20, 2020, the FAD-AGSS, in partnership with the MIRDC Employees Labor Association (SALEM), successfully organized a welfare assistance program for DOST-MIRDC employees and other families who were greatly affected by the eruption of the Taal Volcano at Batangas by donating relief goods and personal care supplies.

As part of our corporate social responsibility and likewise, out of the genuine desire to serve and contribute to the welfare of our fellow Filipinos, DOST-MIRDC also gave assistance to the residents of Lipa City, Batangas who evacuated at Pangao I.S. Evacuation Center. Truly, as we give our conscientious efforts to assist those in need, we are making the world a better place.

Extending welfare assistance to Mr. Noli P. Alvior, one of the greatly affected MIRDC employees from the recent Taal Volcano eruption

Preparation for welfare assistance, Packing of donations, relief goods and hygiene supplies

MIRDC representatives with officials in charge of evacuees at Pangao I.S. Evacuation Center, Lipa City, Batangas after turnover of welfare assistance

Disinfect to Protect

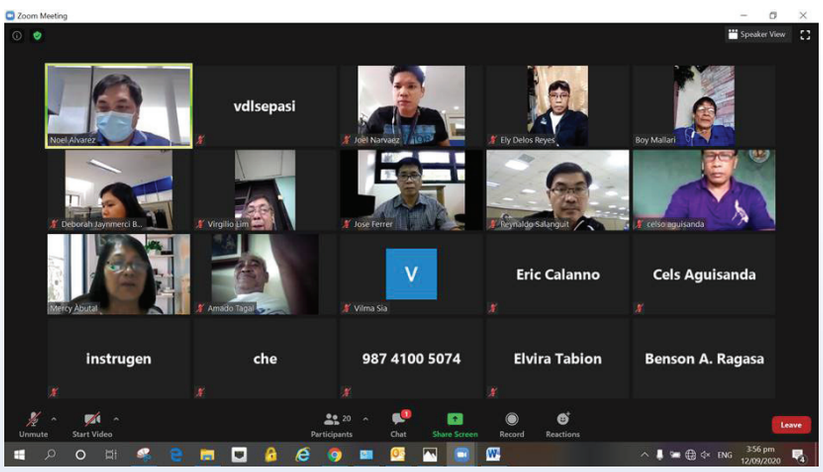
In view of the threat of the COVID-19 pandemic which caused a great alarm all throughout the country at the start of the year and due to the increase of personnel developing flu-like symptoms, the FAD-AGSS facilitated the conduct of a thorough disinfection of all offices, buildings and hallways on March 13, 2020. The maintenance and janitorial services lead by the General Maintenance Unit (GMU) as well as members of the Emergency and Preparedness Response Group (EPRG) collaborated their "bayanihan" efforts to protect the health and welfare of officials and employees physically reporting to the office as well as customers and visitors. This program jumpstarted the regular disinfection of all offices, facilities, and vehicles since the pandemic.

Spearheaded by the FAD-AGSS-GMU, other measures to prevent the spread of the COVID-19 virus include installation of foot baths and hand washing areas at the entrances of DOST-MIRDC buildings, and putting up signages and plastic barriers to implement physical distancing. Furthermore, DOST-MIRDC COVID-19 management related policies, protocols, and applications were created and enhanced for the safety of employees physically attending to work including customers and visitors. Truly, we "Heal as One" as we become socially responsible citizens

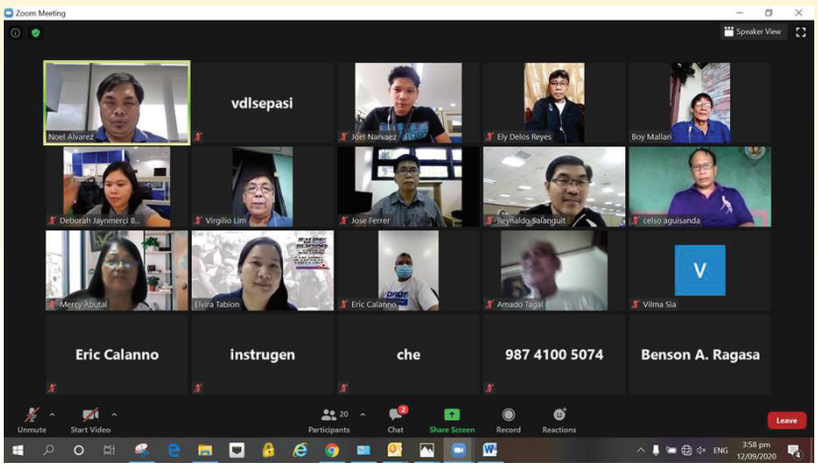
Preparing to be Self Reliant

On December 09, 2020, the FAD-AGSS, with the help and expertise of the Government Service Insurance System (GSIS), facilitated and conducted a "Pre-Retirement Webinar" participated in by 23 employees. The webinar aimed to promote awareness and education regarding the modes of retirement, social insurance benefits, and other matters pertaining to the continuing progress of prospective retirees among government employees. Mr. Noel C. Alvarez of the GSIS discussed thoroughly the different modes of retirement and packages which boosted the interest of the veterans attending the program. At the close of the event, Mr. Alvarez encouraged everyone to reach out to GSIS for guidance regarding queries and concerns.

Engr. Reynaldo O. Bayot with the other EPRG team spearheading the MIRDC disinfection



1st Picture from Left: Mr. Noel C. Alvarez of GSIS shares his knowledge and expertise to MIRDC participants during the Pre-Retirement Webinar



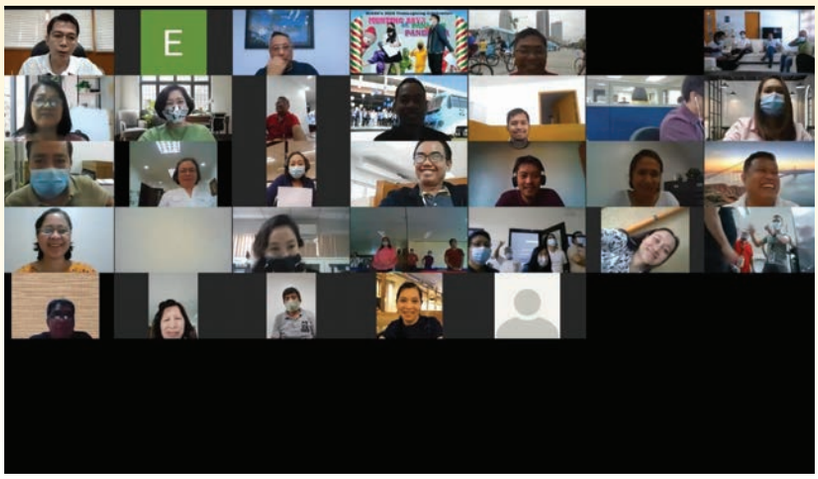
MIRDC employees who participated in the Pre-Retirement Webinar pose in their cameras for a batch picture taking

Finding Joy Amidst the Pandemic

It has been DOST-MIRDC's tradition to cap off each year of hard work and dedication with a joyous gathering. Due to the COVID-19 pandemic, however, gatherings of large groups were restricted. This did not stop the spirit of DOST-MIRDC employees to be thankful amidst adversity. A virtual Thanksgiving Celebration was held last December 16, 2020 with the theme ***"Munting Saya sa Panahon ng Pandemya."*** This was possible with the smart effort and cooperation of the Management, FAD-AGSS and PMD-MIS. Other employees aside from those present thru Zoom platform were also able to view the event real-time through Facebook live. Truly, technology is indeed a blessing in times like this.

The celebration began with a heart-warming welcome remarks from Engr. Jonathan Q. Puerto followed by a message from our Executive Director, Eng. Robert O. Dizon, reminding everyone of how grateful and happy he is to see the smiles in the faces of everyone he missed. He also acknowledged everyone's valuable contribution to the Center's target accomplishments, especially those who physically reported at the Office during the ECQ. Moreover, outstanding employees and those who served in the government with a significant number of years were recognized by the PRAISE Committee during the celebration.

The highlights of the event were the raffle draw lots which made the employees happier and more excited, and the Tik-Tok video presentation numbers participated by the management and employees of every division, with the goal to inspire everyone to give of their time and talents and celebrate the simple joys of the Christmas season. Indeed, there is joy to be found amidst the challenges and that is because we have each other as a family at the DOST-MIRDC.



MIRDC Officials and employees represented by every division were all smiling at the start of the Virtual Thanksgiving Celebration.

(4th Picture from Left): Mr. Osric Primo Bern A. Quibot and Ms. Schatzly Kai B. Dolorfo with their energetic vibes as masters of ceremony

B.4. MIRDC 2020 Awards and Recognition

In commendation and appreciation for the valuable term of service and the exceptional performance as well as attainment in their field of specialization, the MIRDC PRAISE Committee gave recognition to the following personnel from different divisions during the Virtual Thanksgiving Celebration. Below is the list of awardees for CY 2020:

TITLE OF AWARD	NAME OF AWARDEES	DIVISION
LOYALTY AWARD		
Ten (10) Years	Christine P. Avelino	ATD
	Joseph Alfred V. Garcia	MPRD
	Jeffrey C. Obregon	ATD
	Laila R. Porlucas	FAD
	Robert O. Dizon	OED
	Louren Joy G. Asmando	ATD
	Jim Patrick SD. Erispe	TDD
	Sheena S. Bedis	PMD
	Diosito T. Patriarca	FAD
	Edmundo C. Sevilla	FAD
	Ronie S. Alamon	PD
	Walter V. Bonggat	PD
	Mervin B. Gorospe	TDD
	Ervie B. Erispe	FAD
	Katherine T. Llanto	FAD
Fifteen (15) Years	Pablo Q. Acuin	PD
Twenty Five (25) Years	Eduardo V. Diasanta, Jr.	ATD
	Alfred M. Tujon	TSSS
	Emerito V. Banal	TSSS
	Virgilio E. Pasco	TSSS
	Agnes F. Pedraza	FAD
	Rommel N. Coroña	ATD

TITLE OF AWARD	NAME OF AWARDEES	DIVISION
LOYALTY AWARD		
Thirty (30) Years	Reynaldo L. Dela Cruz, Jr. Virgilio H. Macanip Jonathan Q. Puerto Francisco M. Marasigan Zenaida L. Jumilla Edilbert M. Dela Peña Rommel G. Adame Rosario D. Sancon Francisco C. Dime Dominic S. Guevarra Concesa T. Cortez Rio S. Pagtalunan	TDD TSSS OED TSSS FAD TSSS TSSS FAD PD PD TDD ATD
Thirty Five (35) Years	Romeo C. Bermudez Gabriel D. Galotia Alfredo B. Anchorez Mercedita G. Abutal Juanito G. Mallari Laureano L. Dalay	TSSS TSSS TSSS PMD TSSS PD
Forty (40) Years	Virgilio P. Lim Jose B. Ferrer	TSSS PD
Service Award (42 Years)	Vilma A. Sia	TDD
PERFORMANCE EXCELLENCE		
For Year 2019	Alberto M. Oliva	FAD
7 Consecutive Years (2013-2019)	Ronaldo L. Agustin	TDD
SPECIAL AWARDS		
Graduate Studies Master of Technology	Louren Joy G. Asmando	ATD
Production and Distribution of Face Shields	Face Shield 3D Printing Team Plastic Injection Production Team Communication and Distribution Team	MPRD TSSS TDD
2020 National Invention Contest and Exhibits (NICE) Hybrid Electric Train Project **1st Prize** Outstanding Industrial Design and WIPO IP Enterprise Trophy	Jonathan Q.Puerto Rodnel O. Tamayo Pablo Q. Acuin Melchor A. Gamilla Geoffrey L. Abulencia Camilo N. Gorres Glen D. Espeña Rolando F. Ibuig	OED PD PD MPRD MPRD MPRD MPRD MPRD

TITLE OF AWARD	NAME OF AWARDEES	DIVISION
CORE VALUE AWARD		
Professionalism	Mervin B. Gorospe	TDD
Responsiveness	Trinmar A. Boado	PMD
Integrity	Arvin Yan V. Pacia	ATD
Dynamism	Rea C. Castro	PMD
Excellence	Eric B. Casila	PMD
DIVISION MODEL EMPLOYEE		
Level I	Joel B. Narvaez	FAD
	Gil R. Roa	PMD
	Bryle B. Magat	ATD
	Serafin G. Aguilar	MPRD
	Ronaldo L. Agustin	TDD
	Laureano L. Dalay	PD
	Jan Michael E. Saludes	TSSS
Level II	Laila R. Porlucas	FAD
	Eunice A. Bautista	PMD
	Louren Joy G. Asmando	ATD
	Lemuel N. Apusaga	MPRD
	Alma C. Dupagan	TDD
	Ronie S. Alamon	PD
	Cornelio B. Young	TSSS
MIRDC MODEL EMPLOYEE		
Level I	Ronald L. Agustin	TDD
Level II	Louren Joy G. Asmando	ATD
BEST MIRDC SECTION	TDD -ITS	TDD

As DOST-MIRDC's valued human capital, may you continue to be advocates of exemplary performance.

"Tough times tend to breed financial innovations."

The Great Lockdown

In April 2020, President Rodrigo R. Duterte through the provisions of Republic Act No. 11469 or "The Bayanihan to Heal as One Act" exercised emergency measures through National Budget Circular No. 580 which was issued by the Department of Budget and Management (DBM) to respond to the crisis brought about by the Covid-19. Relative to RA 11469, it was directed for the discontinuance of appropriated programs, projects or activities of all agencies of the Executive Department in FY 2019 and FY 2020 General Appropriations Acts (GAAs), including unreleased appropriations and unobligated released allotments. Hence, with the discontinuance of about ten percent 10% of the total released allotments for Maintenance and Other Operating Expenses (MOOE) and Capital Outlays (CO), fraction of the appropriations was no longer available for obligation.

This circumstance greatly affected the regular activities undertaken by the Center, its proponent-agencies, and collaborators. But despite of this adversity, DOST-MIRDC has proven its resilience and determination to serve the needs of the public. Everything went well until the culmination of its operation in 2020.

The Role of Finance

The Financial Management Section (FMS) team did not let the pandemic put the Center's operation down to its knees. They kept on working despite of the health threat and adopted an alternative work arrangement to provide the financial data that update the fiscal agencies of the Center's finances and aided the management in making sound economic decisions.

The Center During the Time of Uncertainty

The Covid-19 pandemic has altered the natural and traditional way of processing, recording and monitoring economic transactions. The use of VPN has become a new normal term among those who availed of the Work from Home (WFH) arrangement. The remote access was granted to the Center's server. This enabled FMS workforce to accumulate financial information using eNGAS in a virtual realm.

The use of internet has become crucial as physical activities were limited. Through the use of this medium, the exchange of information is unhampered by distance.

Indeed, technology provided the Center the best alternative to achieve its commitment, mission, and vision aligned with the national goal of "Healing the Country as One".

B.5.1. Regular Fund: Source and Utilization

Allotment and Obligation

The Center has an initial total approved budget per RA 11465 in the amount of P 272,385,239. This figure is comprised of Personal Services (PS), Maintenance and Other Operating Expenses (MOOE), Capital Outlays (CO), Retirement and Life Insurance Premium (RLIP), Miscellaneous Personnel Benefits Fund (MPBF), and Continuing Appropriations as shown in the tables 12 and 13 below.

Table 12. TOTAL BUDGET FY 2020, Regular

PS	157,863,572.09
MOOE	35,055,427.91
CO	58,560,000.00
RLIP	10,302,000.00
MPBF	7,509,317.00
Total Budget, Regular	**269,290,317.00**

Table 13. TOTAL BUDGET FY 2020, Continuing Appropriations

MOOE	175,463.30
CO	2,919,459.30
Total Budget, Continuing Appropriations	**3,094,922.60**

Table 14. TOTAL BUDGET FY 2020, Regular after NBC 580

PS	157,863,572.09
MOOE	34,652,227.91
CO	49,060,000.00
RLIP	2,670,410.00
MPBF	7,509,317.00
Total Budget, Regular	**251,755,527.00**

Table 15. TOTAL BUDGET FY 2020, Continuing Appropriations after NBC 580

MOOE	119,363.30
CO	2,666,066.72
Total Budget, Continuing Appropriations	**2,785,430.02**

During the spread of Coronavirus in the early first quarter of the year, the national government re-focused its resources by aid of legislation of RA 11469 or the Bayanihan to Heal as One Act, and issued the National Budget Circular No. 580. The appropriation for operations of the Center was trimmed to P254,540,957.02. This amount was inclusive of Retirement and Life Insurance Premium (RLIP), Miscellaneous Personnel Benefits Fund (MPBF) and Continuing Appropriations as shown in tables 14 and 15. The ten percent (10%) of the initial approved budget, or P10,212,692.00 was discontinued.

Out of the new Appropriations, 63% or P 157,863,872.09, was allotted for Personnel Services (PS), 14% or P 34,652,227.91 for Maintenance and Other Operating Expenses (MOOE), 19% or P 49,060,000.00 for Capital Outlay (CO), 1% or P 2,670,410.00 for RLIP, 3% or P 7,509,317.00 for MPBF and 1% for Continuing Appropriations as shown in Figure 11.

Of the total allotment received, the Center obligated P 246,905,151.93 or posted 97% efficiency budget utilization rating for the year 2020 as detailed in Figure 12.

Obligation and Disbursement

Financial performance in terms of Obligation and Disbursement shows 87% as detailed in Figure 13.

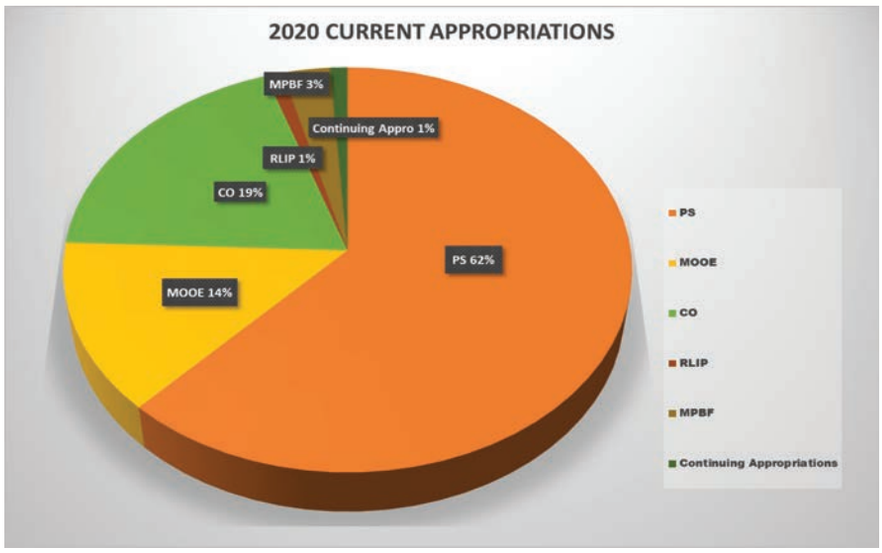


Figure 11. 2020 Current Appropriation
Source: MIRDC-FMS Budget Unit

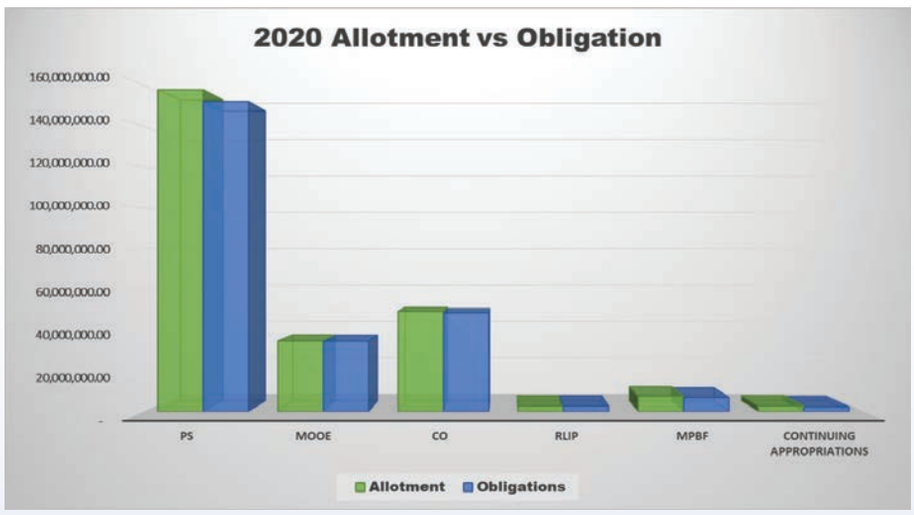


Figure 12. 2020 Current Allotment Received vs Actual Obligation
Source: MIRDC-FMS Budget Unit

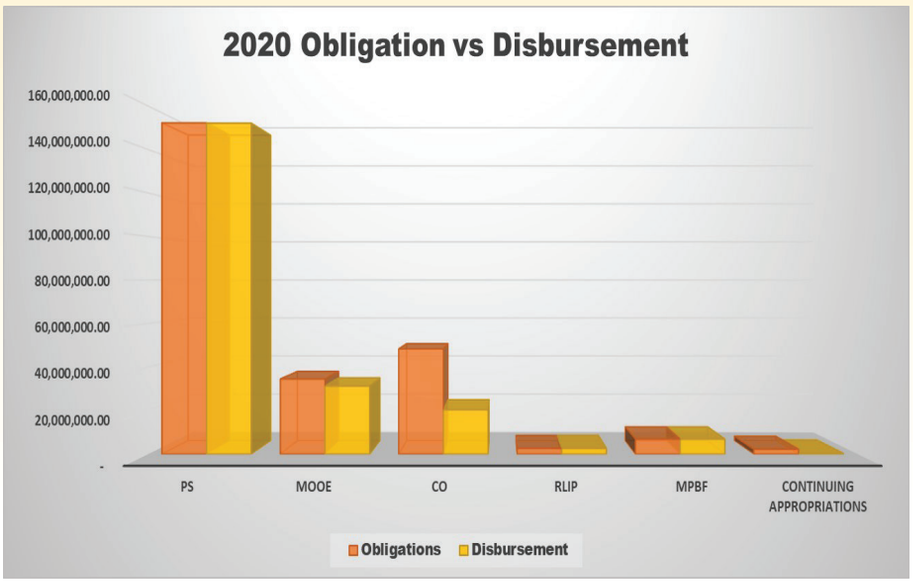


Figure 13. 2020 Obligation vs Disbursement
Source: MIRDC-FMS Budget Unit and Accounting Unit

Cash Allocation and Utilization

The total amount of cash released by the DBM for the year 2020 was P 296,319,770.00 to the Center's Regular MDS Account which include regular operational requirements, payment of terminal leave benefits, and payment of Performance Based Bonus FY 2018.

Of the total cash allotment received for Regular Fund for the year 2020, P 216,998,907.10 were disbursed or posting a 73% utilization rate as exhibited in Figure 14.

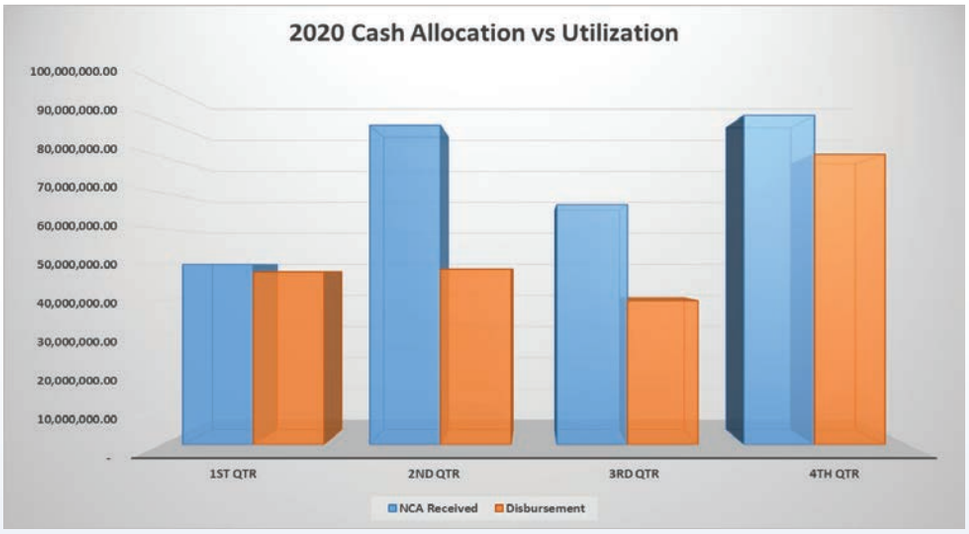


Figure 14. Cash Allocation vs Utilization
Source: MIRDC-FMS Accounting Unit

B.5.2. Trust Receipts: Source and Utilization

Despite the challenges brought by Coronavirus, DOST-MIRDC continued to enter and support collaborative projects with other agencies that respond to the needs and provide support to other industries. The Center received a total amount of P 389,745,269.00 under its Custodial Fund from DBM. This amount represents funding support to manage programs and projects, develop models, fabricate parts, and build equipment. It also includes additional funding support for the continuity of existing programs and projects, various refunds made by customers, performance bond, and refunds of various projects.

Of this amount, the Center disbursed P 229,864,382.52 or 59% of the total cash allocation.

The Custodial Fund provided relief and leverage in the Center's operations. It absorbed a portion of operating costs and shared in the financial burden.

B.5.3. Revenue Generated

In spite of the massive effect of the Coronavirus to many, the Center was able to serve various companies and other government offices in the field of metals and engineering industry, particularly in metal fabrication, metal analysis, calibration, and testing. The Center also administered specialized trainings through webinars to individuals and technical consultations and advisory services in the areas of metals and engineering, quality standards, and intellectual property.

Out of these activities, the Center was able to generate revenues from the different services it provided in CY 2020 in spite of the pandemic. These revenues were subsequently deposited to the National Treasury.

The total amount earned from various sources of revenue during the year was P 18,742,533.03. Included in the reported revenue were constructive income generated out of fines and penalties imposed against agency's suppliers.

GOVERNING COUNCIL MEMBERS

FORTUNATO T. DELA PEÑA
DOST Secretary/Ex-Officio Chairperson

ROBERT O. DIZON
Executive Director, MIRDC

JIMMY T. CHAN
Metals Industry Sector

ANTONIO A. GIMENEZ
Allied Industry Sector

JUANCHO PABLO S. CALVEZ
(Representative of Atty. Wilfred G. Moncano)
DENR - Mines and Geosciences Bureau

NEIL P. CATAJAY
DTI - Bureau of Philippine Standards

DIONISIO G. ALVINDIA
Department of Agriculture - PhilMech

MA. CORAZON H. DICHOSA
DTI - Board of Investments

BIEN A. GANAPIN
National Economic & Development Authority

ALBERTO M. ALBANO
Engineering Industry Sector

THE MANAGEMENT

Engr. Robert O. Dizon
Executive Director, MIRDC

Dr. Agustin M. Fudolig
Deputy Executive Director for Research and Development

Engr. Jonathan Q. Puerto
Deputy Executive Director for Technical Services

Dr. Rio S. Pagtalunan
Chief, Analysis and Testing Division

Engr. Fred P. Liza
Chief, Materials and Process Research Division

Ms. Mercedita G. Abutal
Chief, Planning and Management Division

Atty. Trixie Hazel C. Veluz
Attorney IV

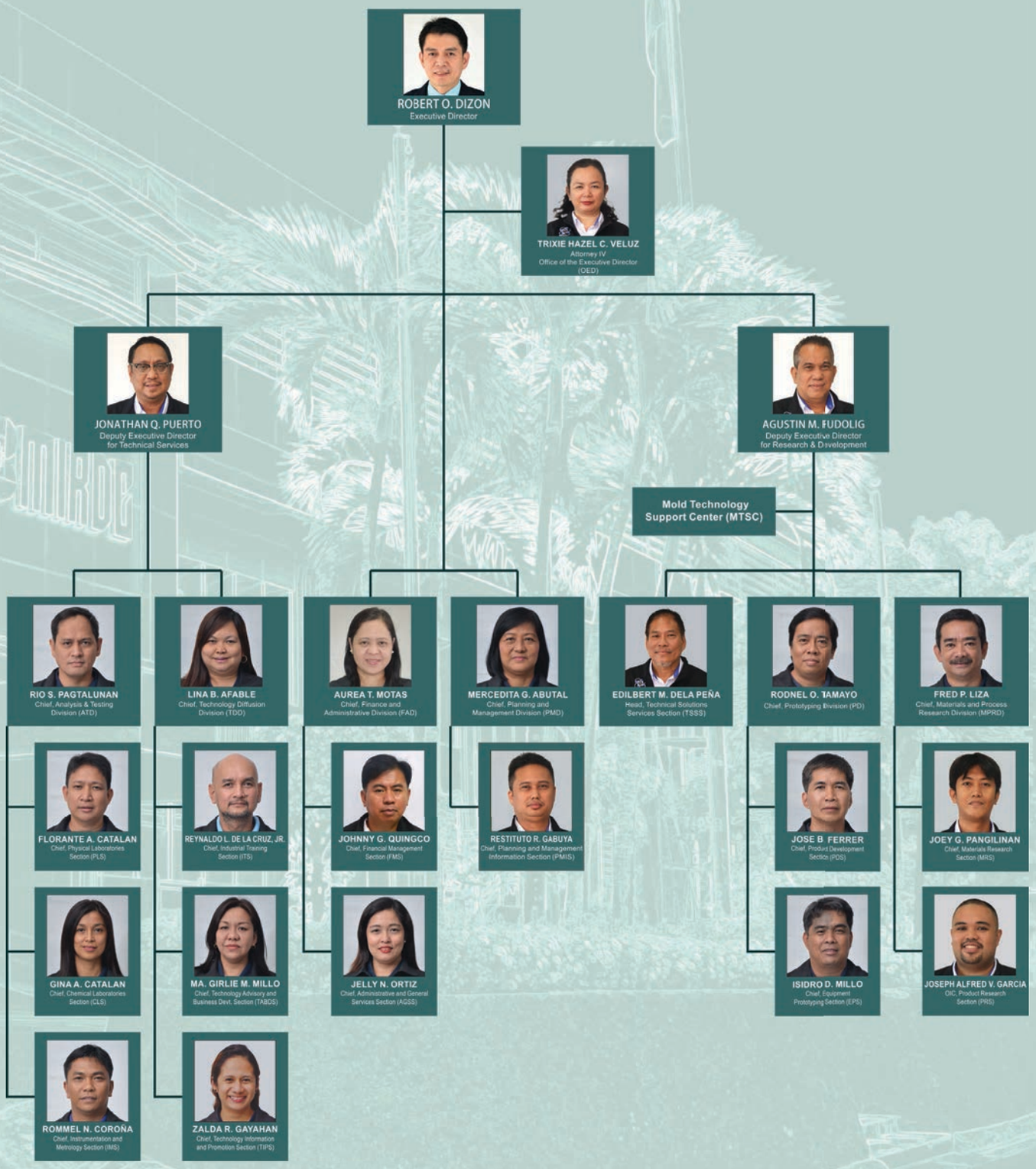
Ms. Aurea T. Motas
Chief, Finance and Administrative Division

Engr. Rodnel O. Tamayo
Chief, Prototyping Division

Ms. Lina B. Afable
Chief, Technology Diffusion Division

MIRDC ORGANIZATIONAL STRUCTURE

(As of December 2020)

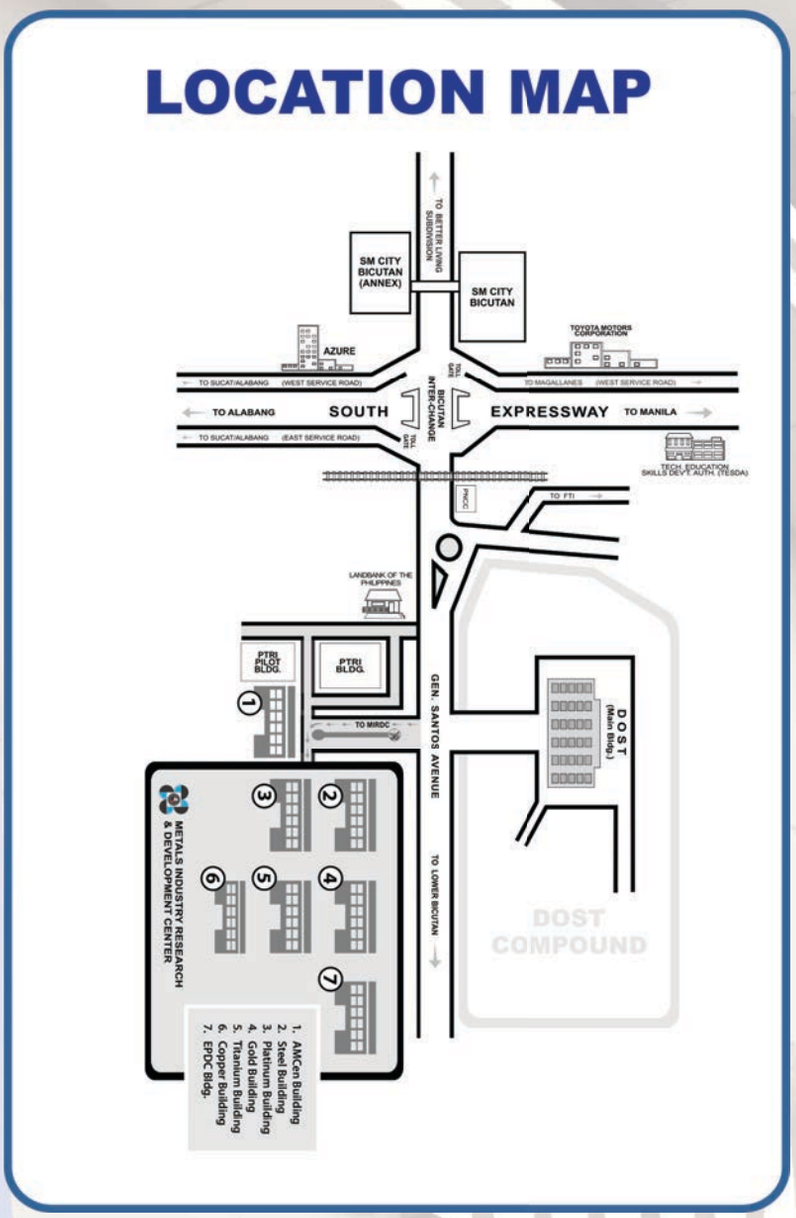


Office of the Executive Director

Research and Development Directorate

Technical Services Directorate

DOST-MIRDC LOCATION MAP



EXTENSION OFFICES

REGION VI
DOST Regional Office No. 6
Magsaysay Village, La Paz, Iloilo City
Tel. No.: (033) 320-0908
Fax No.: (032) 320-0908
Contact Person: Engr. Felipe G. Pachoco

REGION X
DOST Regional Office No. 10
J. R. Borja Memorial Hospital Compound
Carmen, Cagayan de Oro City 9000
P.O. Box 150
Tel. No.: (088) 858-3931 (Admin)
(088) 858-3932 (Director's Office)
(088) 858-3933 (Technical)
Contact Person: Engr. Roy C. Sagrado

MIRDC HYMN

Kaya Ko, Kaya Mo, Kaya Nating Lahat

Tungkulin mo't tungkulin ko
Paglingkuran lahat kayo
Buong husay, buong ingat
Sa lahat ng oras
Gamit ang Agham at Teknolohiya
Patuloy na manaliksik pa
Handog twina, bagong kaalaman
Industriyang metal mapayaman
Kung kaya ko, ay kaya mo
At kaya nating lahat
Lahat ng bagay na mabigat
Kung sama-sama'y mabubuhat
Ang pag-unlad matutupad
Kung matapat ang gaganap
Ikaw, ako, tayong lahat
Isusulong ang bukas

Koro 1
Kaya ko, kaya mo, kaya nating lahat
Industriya ay tutulungan, pribado o gobyerno man
MIRDC ang Sentro na magbubuklod nito
Ang tagumpay makakamit kung sama-sama tayo
Instrumental
Tungkulin ay gagampanan, kakayahan ilalaan
Tayo ay maglilingkod nang buong katapatan
Gagawin nang mabilis, lahat sa tamang paraan
At ating mararating tagumpay na inaasam
(Ulitin ang Koro 1)
Koro 2 (a capella)
Kaya ko, kaya mo, kaya nating lahat
Ating baya'y tutulungan, marating ang pag-unlad
Tayo ay magtulungan upang ating marating
Ang pag-unlad kung sama-sama'y kaya natin
(Ulitin ang Koro 1 at instrumental)
Kaya ko, kaya mo, kaya nating lahat

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