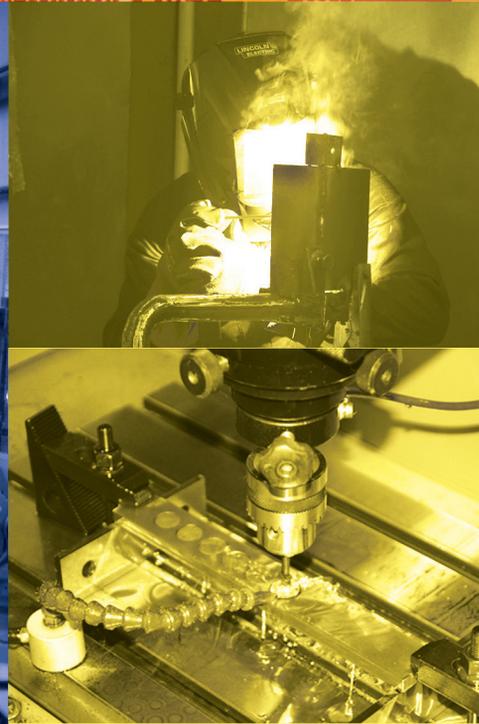




MIRDC 2018 ANNUAL REPORT



Putting the M&E Industries
at the Forefront of a New
Industrial Revolution



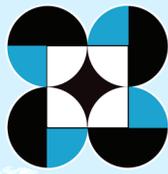
Cover Page Photo Credit: *(Robotic Arm)*

Building a Smart Factory with AI (Artificial Intelligence) and Robotics. The smart factory is becoming reality, as manufacturers take advantage of the latest in machine learning, big data, and robotics for new levels of efficiency and competitiveness.

Source: <https://www.roboticsbusinessreview.com/download/building-a-smart-factory-with-ai-robotics/> 2.19.2019

TABLE of CONTENTS

Message from the DOST Secretary	2
Message from the MIRDC Executive Director.....	3
Vision and Core Values	4
Mission and QEMS Policy	5
Section 1. Major Operations	
A. Metals Industry Research Program	6
B. Metals Industry Technology Transfer Program	28
C. Metals Industry Science and Technology Services Program...	37
Section 2. General Administration and Support	
A. Accomplishments for the Metals Industry from other DOST-MIRDC Support Activities.....	41
B. Human and Financial Resource Management	46
Section 3. Infrastructure	
A. ICT-Capability Upgrading	68
B. Other Infrastructure Projects	70
Governing Council.....	73
The Management.....	74
Organizational Structure	76
The Divisions	
Office of the Executive Director	77
Prototyping Division.....	78
Materials and Products Research Division	78
Analysis and Testing Division.....	79
Technology Diffusion Division	79
Planning and Management Division.....	80
Finance and Administrative Division	80
Location Map and Extension Offices.....	81
MIRDC Hymn	82
Editorial Board.....	83



MESSAGE from the SECRETARY

Looking at how other economies perform where global competitiveness is concerned, we find ourselves at the upper half of the statistics. The Philippines, based on the Global Competitiveness Index (GCI) Report 2017-2018, is ranked 56 among 137 countries covered. Although this is already quite an accomplishment, there is still so much room for improvement.

The Department of Science and Technology (DOST), together with all its attached agencies, are implementing several programs and providing various services aimed to improve the country's standing where the following are concerned: higher education and training, technological readiness, and innovation. Our programs and services are meant to advance the Filipinos' quality of life through science

and technology-based initiatives, which ultimately are what DOST envisions to significantly contribute to the country's aim toward improved global competitiveness.

All these years, the DOST-Metals Industry Research and Development Center (DOST-MIRDC) has remained responsive to the requirements of the metals, engineering, and allied industries. The programs and projects the Center implements, as well as the services and facilities it offers, provide an enabling environment for our industry players – so that they, too, can continually be of relevant service to other upstream industries that rely on them.

I commend the Center for consistently carrying out strategic and purposeful schemes to provide relevant and reliable services, primed by its management systems, attuned to the needs of the times. I am deeply proud of the accomplishments of the DOST-MIRDC and the significant role it plays for the M&E and allied industries, which will always be one of the country's most dependable economic drivers.

I encourage the MIRDC to keep up the remarkable work. Together, let us continue to pursue further advancement of science, technology, and innovation. Let us be consistent and aggressive in our drive toward increased global competitiveness for the long-term benefit of the Filipino people.



FORTUNATO T. DELA PEÑA

*Secretary, DOST
and Chairperson, MIRDC
Governing Council*

DOST



MESSAGE from the EXECUTIVE DIRECTOR

Our economy faces serious challenges brought about by diverse phenomena such as globalization, climate change, and the Fourth Industrial Revolution along with the rest of the world. Although these are undoubtedly changing cultures, businesses, and interrelationships among nations, the Philippines continues to carry out various strategies that enable it to overcome challenges and take an active part in the world's pursuit for global competitiveness and innovativeness.

Behind our economy's impressive performance over the past years is the industry sector whose resilience is backed up by our bullish manufacturing industry. It is within this industry that the local metals, engineering (M&E), and allied industries are creating significant impacts crucial to enabling our country to catch the attention of those in the region and as well as those in other parts of the world.

In this light, I am proud to present the 2018 MIRDC Annual Report which contains the compilation of the Center's accomplishments and support activities that underlie its reason for existence, and that is to propel the metals, engineering, and allied industries toward global competitiveness.

This year's Annual Report is bannered by the theme, 'Putting the M&E Industries at the Forefront of a New Industrial Revolution.' I would like you to take a look at the products and services that are results of our R&D initiatives that focus on the

areas of transportation, machine-building, materials and minerals processing, and defense and security. I am also proud to present our accomplishments concerning technology transfer and S&T services. As we implement programs and projects, the Center is taking the M&E industries along a path that leads toward the enhancement of skills that will prepare us to cope with fast-paced developments related to the industrial revolution taking place worldwide.

I am grateful for the support of the Department of Science and Technology (DOST) in all the Center's endeavors. I am also very honored to be working with the dedicated personnel of the DOST-MIRDC, whose hard work allows the Center to achieve its goals and indeed make a difference for the M&E and allied industries.


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.

CORE VALUES

- P**ROFESSIONALISM We adhere to the highest ethical standards of performance.
We value our work and are committed to perform to the best of our ability.
- R**ESPONSIVENESS 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.
- I**NTEGRITY We act responsibly, work honestly, and encourage transparency.
- D**YNAMISM We perform our jobs with vigor and enthusiasm.
We welcome change as an opportunity for growth and continual improvement.
- E**XCELLENCE We adhere to world-class performance and continuous improvement in all we do.
We always do our best in every task/endeavor.



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 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 and Environmental 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.

SECTION 1: MAJOR OPERATIONS

DEPARTMENT OF SCIENCE AND TECHNOLOGY METALS INDUSTRY RESEARCH AND DEVELOPMENT CENTER

Theme: Putting the M&E Industries at the Forefront of a New Industrial Revolution

We are proud and privileged to be one of the research and development institutions (RDIs) of the Department of Science and Technology (DOST). What sets the DOST-Metals Industry Research and Development Center (DOST-MIRDC) apart from other DOST RDIs is its direct involvement with the industries that serve as the backbone of the Philippine economy.

The DOST-MIRDC's efforts to reach out to and serve the metals, engineering, and allied engineering industries are intended to be felt in the form of relevant assistance that will propel them towards enhanced productivity and increased global competitiveness. In 2018, the Center engaged in various initiatives that were determined to be strategic in accomplishing targets and in creating the significant impacts that it so desires for the local metal, engineering, and allied industries.

Presented below is the summary of the Center's activities and accomplishments in 2018, categorized into three (3) major programs/key performance indicators, namely: (A) Metals Industry Research Program; (B) Metals Industry Technology Transfer Program; and (C) Metals Industry Science and Technology Services Program.

A. Metals Industry Research Program

The Global Competitiveness Index 2017-2018 Rankings placed the Philippines in rank 56 out of a total of 137 economies. Switzerland, the United States, and Singapore are ranked first, second, and third, respectively. In the Global Innovation Index, on the other hand, the Philippines ranked 73rd out of 126 economies. We are among the lower-middle income countries. Of the 30 countries in this category, we are 9th. Of the 15 Southeast Asia and Oceania countries

covered in the index, we ranked 13th, which makes us 'below average.'

Things are not that bleak-looking though, as the Philippines has strengths whose combinations make it unique in its own rights. We are strong with regard to graduates in science and engineering, firms offering formal training, percentage of research talents in business enterprise, and high- and medium-high technology manufactures, to name a few.

These rankings and specific pillars provide us sound basis for formulating strategies and designing our R&D initiatives to ensure that their outputs will address our weaknesses, and further enhance our strengths – for the country to perform better in these global rankings and allow inclusive growth and profitability.

A.1. We completed R&D projects.

As an R&D institute, the Center carries out R&D projects to strategically provide reliable and long term science and technology-based solutions to the rapidly changing issues and challenges faced by the M&E industries. As mentioned, the Center's R&D initiatives are focused on any of the following programs: (1) Advanced Transportation; (2) Machine-Building; (3) Materials and Minerals Pro-

cessing; and (4) Defense and Security. We proudly completed 36 R&D projects in 2018.

A.1.1. Advanced Transportation

The Center completed a total of 12 advanced transportation-related R&D projects with the involvement of the MPRD and the ATD. Table 1 presents a list of these Advanced Transportation projects.

Table 1. List of Completed R&D Projects Focused on Advanced Transportation, 2018

Project Title	Implementing Division	Type of R&D/ Source of Funding
1. Development of Commercial Prototype AGT System in UP Diliman	MPRD	Internal, DGIA
2. Testing of Standardization and Optimization of Five Coach Hybrid Road Train (Phase III)	ATD	Internal, GAA
3. Development of Anti-Climbing Mechanism for Hybrid Electric Train	MPRD	Internal, GAA
4. Development of Semi-Permanent Coupler for Hybrid Electric Train	MPRD	Internal, GAA
5. A Comparative Study on the Use of Galvanized Angle Bar Versus Copper Bar as Conductor Rail of the Automated Guide-way Transit	MPRD	Internal, GAA
6. Design and Rescue/Maintenance Vehicle for Automated Guide-way Transit (AGT) System	MPRD	Internal, GAA
7. Design of a Prototype Gangway Connection for Automated Guide-way Transit (AGT)	MPRD	Internal, GAA
8. System Expansion of 120-Passenger Per Coach Capacity Automated Guide-way Transit (AGT) System	MPRD	Internal, DGIA
9. Modification of Road Train Energy Storage System Using Lithium Ion Batteries	ATD	PCIEERD GIA
10. Performance Testing and Evaluation of the Prototype Trainset – Year 2	MPRD	GIA
11. AGT End of Project	MPRD	GIA
12. Evaluation of Different Guide Wheel Frame Construction through Finite Element Analysis	MPRD	Internal, GAA



The DOST-MIRDC's Hybrid Electric Train

The DOST-MIRDC's Advanced Transportation Program began in 2010 with the Automated Guide-way Transit (AGT) System Project. Nine (9) years after, the AGT, the Hybrid Electric Road Train (HERT), and the Hybrid Electric Train (HET) are now making their own individual stories. Successful in their own rights, more shining moments are yet to unfold in the journey of our very own alternative mass transportation technologies.

The remarkable support system among the various divisions of the Center is evident in the successful implementation of advanced transportation projects. Take for instance the HERT, whose implementation relied heavily on the services of the Physical Laboratory Section (PLS) under the Analysis and Testing Division (ATD). There were several testing activities required to be performed on the HERT, and the PLS's portfolio of capabilities is a key factor that contributed to the success of these project activities.

The transport body impact tester of the Auto-parts Testing Laboratory under the PLS was used to assess the functionality design of an anti-climbing mechanism body to be used as a deterrent against heavy damage in case of collision. In this particular assessment, increasing impact energy were applied to the anti-climbing mechanism and the corresponding deformities were recorded. Relationship between the energy absorbed and the deformities were established.

Box 1

The HET: RAMS Testing Certified!

The Hybrid Electric Train (HET) was declared by the Philippine National Railways (PNR) as a successful initial stage certification recipient. The initial stage testing refers to the conduct of the Reliability, Availability, Maintainability, and Safety (RAMS) testing, which centered mainly on the EN 50126 or RAMS European Standard.

The HET was subjected to a 5,000 km distance run using the Mamatid and Cabuyao Stations of the PNR. The required distance was completed in three (3) months.

The floor level of the HET was lowered to make entry and exit of passengers safer and more comfortable prior to the first stage certification. Aside from this major improvement in the HET, additional security devices such as air pressure sensors, door interlocks, and emergency exit switches were installed on all coaches to further ensure the passengers' safety.

Passing the RAMS certification confirmed the HET's compliance against a range of national and international quality and safety standards of railway systems. With the successful first stage certification, the HET is set to undergo second stage testing, or validation, where the HET will be utilized as a revenue train for 150 operating hours along the main line of the PNR.



Impact Testing of an Anti-Climbing Mechanism

Further, the PLS testing facility assessed the load/speed and endurance functionality of the tires used by both versions of the HERT to ensure the capacity limits of the tires based on the declared specification of the manufacturer. Full load capacity and speed were simulated to determine the breaking point of the tires. Aside from this, 'Load vs Deflection' testing was also conducted by the PLS on the HERT.

The Center's Instrumentation and Metrology Section (IMS) was also tapped to provide its services to HERT-related R&D projects.

The original energy storage system which is composed of 208 deep-cycle lead-acid batteries was replaced by an energy storage system composed of 22 lithium titanium oxide batteries. Based on the performance testing done, the use of lithium titanium oxide batteries results to the following: (1) a significant decrease in weight of the power coach enabled the light version of the HERT to traverse an inclined road even at full load, thereby it is safe to say that the HERT-light version has better mobility and acceleration; (2) lesser number of batteries reduced electrical connections of the battery banks and also reduced electrical hazards. This R&D activity made management and maintenance of the batteries easier. The capability of the IMS was crucial in the Center's attempt to improve the acceleration, safety, mobility, and energy recovery and power-sharing features of the HERT light.



Fractured sample of a tire subjected to load/speed and endurance test.



Actual conduct of 'Load vs Deflection' test for the HERT project.



(Left and center) Set-up of the battery management system (BMS) showing the newly-installed lithium ion batteries; (right) laptop displaying the output of the BMS.

A.1.2. Machine-Building

Metalworking technologies are central to the manufacturing industry’s capability to build machines and equipment. Developing and improving processes entail the development and improvement of machines, if one is after significant results. The Center, banking on its metalworking capabilities and cutting-edge technologies, engaged in R&D projects focused on machine building. There are a total of 15 machine building projects successfully undertaken by the Center, through its Prototyping Division (PD). The said projects are listed in Table 2.

Table 2. List of Completed R&D Projects Focused on Machine Building, 2018

Project Title	Implementing Division	Type of R&D/Source of Funding
1. Development of a 30-Tons Capacity Hydraulic Pipe Bender with Stationary Anvil	PD	Internal, GAA
2. Design and Development of 1 KW Pico-Hydro Turbine	PD	Internal, GAA
3. Design and Development of Trash Bin	PD	Contract Research, Limetech Singapore
4. Design and Development of 50-tonner Vertical Baler with Semi-Automatic Strapping	PD	
5. Design and Development of Hydraulic Waste Transfer Lifter	PD	
6. Development of an Improved Portable Manual Abaca Fiber Stripping Machine	PD	Contract Research, CARE Phils.
7. Development of Katokatz Template Mold	PD	Contract Research, RITM
8. Development of a Sugarcane Juicer for Community-based Organic Muscovado Production	PD	Contract Research, RU Foundry and Machine Shop, Corp.
9. Development of a Chemical Dosing Equipment	PD	Contract Research, No Ka Oi Phils., Int’l. Inc.
10. Pre-commercialization Services of Rice Transplanter Attachment (RTA) and Rice Harvester Attachment (RHA) for Hand Tractor	PD	GIA PCAARRD
11. Development of Ceramics Equipment (12-units Electric Potter’s Wheel)	PD	Joint Research, DTI
12. Development of Ceramics Equipment (5-units Jigger & Jolly Machines)	PD	Joint Research, DTI
13. Piloting of an Improved Portable Manual Abaca Fiber Stripping Machine	PD	Joint Research, CARE Phils.
14. Design and Process Optimization for the Production of the Shredder Blades	PD	Contract Research, RU Foundry and Machine Shop Corp.
15. Design Evaluation and Optimization of Muffler Cover Die	PD	Contract Research, AC-10 Precision Tools, Inc.

Box 2***Locally-made equipment to boost Filipinos' rice farming capabilities***

The DOST-MIRDC tapped the Synergy Market Research and Strategic Consultancy to conduct a market study on the Rice Transplanter Attachment (RTA) and the Rice Harvester Attachment (RHA) for Hand Tractor. Findings of the study reveal that the functionality of the RTA and the RHA are both well-accepted by rice farmers in Mindanao and Northern Luzon. The business plan developed through this initiative showed that the fabrication of RTA is economically feasible with an internal rate of return of 1,046% and a payback period of less than a year. Likewise, the RHA is also financially viable with an internal rate of return of 653% and a payback period of less than a year.

Acquisition of the equipment, however, poses a challenge as the individual income of farmers cannot cover the equipment's high cost. The study came up with a recommendation for government-sponsored programs to be planned and executed to support the farmers and their respective cooperatives for the acquisition of the RTA and RHA technologies.

Utilization of the RTA and the RHA is seen to enhance the level of rice farming in the country by increasing the performance and productivity of hand tractors currently used by Filipino farmers.



The Rice Transplanter Attachment (top) and the Rice Harvester Attachment (bottom) for Hand Tractor

Some of the very important highlights of these machine building-related R&D projects are those that are categorized under agriculture, power generation, waste management, and crafts.

The R&D projects carried out by the Center do not only mean to boost capabilities of our rice farmers. We also consider the technology requirements of our farmers specializing in growing and harvesting other produce so that they benefit from value adding initiatives on their products.

Farmers in Antique are growing abaca for livelihood. The DOST-MIRDC also launched and implemented an R&D project whose output will benefit both abaca farmers and livelihood communities that engage in abaca crafts making. Ultimately, this R&D initiative is seen to result to a more vibrant business for the metal fabricators in the province.

Box 3

Sugarcane Farmers May Look Forward to An Alternative Source of Income

Negros Occidental is known for its vast sugarcane plantations and sugar production. Aptly called the ‘sugar bowl’ of the country, this province is finding ways of exploiting sugar cane harvest for the benefit of its farmers. The Department of Agrarian Reform, in cooperation with the Eco Agri Development Foundation, Inc. and the RU Foundry and Machine Shop Corp., is focusing efforts for the production and processing of organic muscovado at the community level. This effort is aimed at establishing an alternative source of income while farmers wait for the harvest of their planted sugarcane.

The RU Foundry has already perfected the process of producing organic muscovado using small scale facilities. What they needed was a sugarcane juicer to hasten the process of extracting juice

from the sugarcane, the raw material that will be processed into organic muscovado.

Enter the DOST-MIRDC’s Sugarcane Juicer. It aims to complement the efforts of Negros Occidental LGU’s campaign to produce safe and healthy foods through the adoption of organic farming practices. The locally developed sugarcane juicer will empower businesses as there is an assured market which starts at the local level. It will also serve to bring in a steady source of income for farmers and their wives during sugarcane off-season.



A DOST-MIRDC staff inspects the Sugarcane Juicer

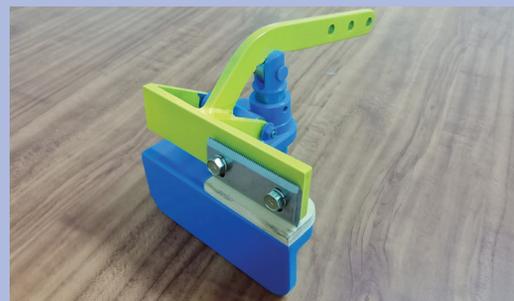
Box 4

Stripping Abaca Fiber is Made Easier

The implementation of the project entitled, ‘Development of an Improved Portable Manual Abaca Fiber Stripping Machine,’ led to the production of a portable manual abaca fiber stripping machine prototype.

Testing and evaluation of the portable manual abaca fiber stripping machine solicited positive feedback from the farmers themselves. As such, the project team held the ceremonies for the turnover and demonstration of the machine at the 2nd Provincial Abaca Congress of Antique on April 12, 2018 at San Jose, Antique.

Part of the project deliverables is the identification of possible local fabricators for the pilot production and commercialization of the machine.



Portable Manual Abaca Fiber Stripping Machine

Box 5***More power to you.***

Hydropower technology is a matured technology enjoyed largely by the Philippines as attested by the presence of numerous hydropower installations managed by the National Power Corporation (NPC). However, there remains potential for the micro and pico-hydropower schemes which benefit small communities and neighborhood close to good hydropower sites especially those cut off from the main power lines due to sparse population density. The problem with lack of power supply is that it results lack of access to water supply, compounding the challenge even more.

The DOST-MIRDC designed and developed a 1kW Pico Hydro Turbine which is suited for low head applications. Using a model provided by the Philippine National Oil Company – Renewable Energy Group, the Center developed a prototype propeller type pico-hydro turbine which consisted of the runner (propeller), runner cone, wicket gate, diffuser, power shaft, and generator. The entire turbine was developed by the Center, except for the generator.

The test that was conducted using a modified test rig confirmed the capacity of 1kW. The testing was carried out with the assistance of Agricultural Machinery Testing and Evaluation Center (AMTEC), Institute of Plant Breeding (IPB), and Central Experiment Station (CES) of the University of the Philippines Los Baños. However, actual field testing is still recommended to verify the data gathered using the MIRDC modified test rig.



Turbine at work (top) and the Center's modified test rig (bottom)

We are equally proud of our R&D output not only for the agriculture industry, but also for power generation. This project is where the use of hydropower technology and meeting the power requirements of our fellow Filipinos in far communities converge and make life better.

The Center also has the crafts-makers in mind in its machine building initiatives. Our metalworking technologies and facilities provide us with the capabilities to develop machines that will bring up the level of competitiveness of the metal fabricators as they will be the ones who must cater to the needs of the handicraft industry.

Box 6

Imported, No More.

The implementation of this R&D project aimed to localize the design and fabrication of the electric potter's wheel and jigger and jolly machines. Identified by the Department of Trade and Industry-National Capital Region Office (DTI-NCRO) as vital equipment for the Fabrication Laboratory (FABLAB), the concern on their availability in the local market was raised and needed attention.

This is where the DOST-MIRDC comes in. The Center based the design and fabrication of these machines from

the existing imported machines. The developed electric potters' wheel has a diameter of 14 inches and can rotate up to 250 rpm using a 1/2 hp motor. The jigger and jolly machine is equipped with a plaster holder and tool holder ready for the attachment of jiggering and jollying tools. A 1/2 hp motor was installed with a foot pedal brake. The frames were powder coated for corrosion protection and aesthetic purposes.

This research and development activity will directly benefit the FABLAB in UP-Diliman as well as the local ceramics industry and the metals and engineering industry.



Electric Potter's Wheel (L) and Jigger and Jolly Machine (R)

A.1.3. Materials and Minerals Processing

Not only does the DOST-MIRDC's R&D projects focus on advanced transportation, these are also aimed to address the industry's requirements for materials and minerals processing. Table 3 presents a summary of these R&D projects.

Table 3. List of Completed R&D Projects Focused on Materials and Minerals Processing

Project Title	Implementing Division	Type of R&D/Source of Funding
1. Modification of Primary Slurry Materials for the Development and Improvement of Investment Casting Coating Process	MPRD	Internal, GAA
2. Establishment of Parameters for the Annealing of Brass	MPRD	Internal, GAA
3. Assessment of Broken Chain Sling Using Optical and Scanning Electron Microscope	MPRD	Internal, GAA
4. Case Depth Verification and Hardness Measurement of Vacuum Carburized Low-Carbon Steel	MPRD	Internal, GAA
5. Development of Environment-Friendly Anodizing Process (Chromium-free) by Using Boric-Sulfuric Acid Solution	MPRD	Internal, GAA
6. Tensile Strength Characterization of Quenched and Self-Tempered (QT/TMT) Reinforcing Coupled and Welded Steel Bars	ATD	Internal, GAA
7. Design and Development of Austenitic Manganese Steel Liners for Philippine Aggregates and Mineral Processing	MPRD	PCIEERD GIA
8. Technical and Economic Feasibility Study to Determine the Most Suitable Iron Making Technology for Value Adding of Philippine Magnetite Resources	MPRD	GIA

Box 7

Most Suitable Ironmaking Technology Identified for Value Adding of Magnetite Resources of the Philippines

It was found out that the Rotary Kiln-Electric Furnace (RKEF) process is technically feasible and is the most suitable ironmaking process, compared to the Midrex, Corex, and blast furnace (BF) processes.

Philippine magnetite sand concentrate contains considerable amount of Titanium which limits its use in blast furnace operations. Reduction behavior of the Philippine magnetite pellets in shaft direct-reduction (ISO 11258) are considered good, but their low Fe grade as compared to typical iron ores used for DRI production (>65%Fe) makes them ineligible as feed to the Midrex or HyL process. Reduction behavior under conditions in liquid phase (ISO 7215) are also good, but the compressive strengths and the low temperature reduction-disintegration indices of the fired pellets are too low and not suitable for BF or Corex operations.

Nevertheless, the local magnetite sand concentrate at >58%Fe can be pelletized and used as a blend to hematite ores to constitute the charge fed to a blast furnace or a Corex ironmaking plant. The blast furnace and the Corex process cannot accommodate a charge made up entirely of the magnetite sand concentrate due to the effect of titanium on slag properties that can interfere with the productivity in hot metal production. The attainable grade of the local magnetite sand, even when beneficiated, cannot match the iron ore grades of more than 65%Fe used in DRI production by the Midrex process. The compressive strengths of the pellets obtained in this study were also too low to withstand load pressures in the blast furnace, Corex and Midrex process, although further tests are recommended.

The economic pre-feasibility study among RKEF process charged with local magnetite sand concentrate and three (3) other ironmaking processes: blast furnace, Midrex process and Corex process, all charged with typical low-Ti content iron ore fines and/or lump ore, indicated that the RKEF process has a decent ROI and IRR which values at 12.4% and 8.7%, respectively. These economic



Dr. Agustin M. Fudolig, MIRDC's Deputy Executive Director for Technical Services and Value Adding Project Leader, with one of the rotary kilns of New Zealand Steel ironmaking plant in Glenbrook, New Zealand.

indicators could rise further when the production costs of iron sands are taken instead of market prices, and an entity with the coal mining resources is available locally. Thus, the RKEF route of iron making will be more economically feasible wherein the IRR is much more than hurdle rate when the iron sand is available at <US\$25/ton and high volatile sub-bituminous coal is priced at <US\$65/ton. The blast furnace route is the most economically viable, however, it cannot operate when fed entirely with local magnetite sand concentrate but rather requires the use of imported iron ore (hematite) and coking coal.

With these study findings, the Center recommends the establishment of a Ferrous Metallurgical Processing Laboratory, which may be best hosted by the Mines and Geosciences Bureau (MGB). The equipment needed for the said facility include the Simultaneous Thermal Analysis (STA); Pot grate facility for induration tests; Multi-standard Reduction System and auxiliary, among others.



Dr. Fudolig discusses with Dr. Daniel Spreitzer of Montanuniversität Leoben, Austria on the reduction tests to be done on pelletized Philippine magnetite sand. Shown in the background are the equipment to be used for the reduction tests.

Box 8

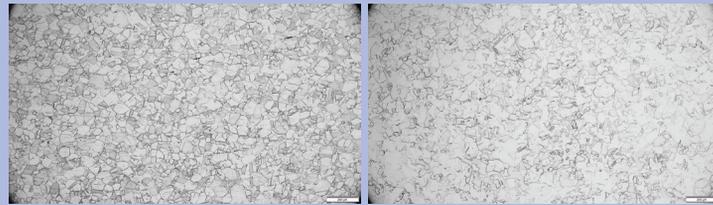
Gongs Made of Brass Made Better through Heat Treatment

Brass is a material that is used for the fabrication of gongs. Chemical analysis of brass used in this project showed approximately 65%Cu-35%Zn composition. In gong fabrication, the gong is usually hammered by expert hammer strokes to produce the final tuning, before being re-heated and allowed to cool slowly to give it a measure of hardness. The introduction of heat treatment is crucial in providing hardness or softness (due to subsequent mechanical working) required for every step of the process.

The project team performed on-site heating and cooling of brass

material. LPG with multiple nozzles was used to apply heat, while thermal chalk was used to approximate temperature. The project objective, which is to establish the optimum parameters (temperature, time, and quenching medium) for the annealing of brass in the form of sheets only using heat treatment furnace, guided the team in achieving its targets.

The Center's heat treatment technology builds the industry's capability to improve the hardness of metals, including brass which is a material used in the fabrication of gongs.



A look into the metallography of brass: structure as supplied (left), structure as annealed (right).

Box 9

MIRDC's Vacuum Carburizing Oil-Quench Furnace for the Industry's Capability Building

The principle of carburizing is to alter the chemical composition of a material's surface, in this case adding carbon to increase the amount up to a certain depth from the surface, in order for the material to react with the hardening process. In effect, a "case" is being developed on the surface with its hardness greater than the core. Case depth therefore is the thickness of the hardened layer. Below this hardened layer is the core with soft and ductile property. The importance of carburizing is to improve both the wear resistance and the fatigue strength of steel components under dynamic and thermal stresses.¹

To avail vacuum carburizing services, local industry players often send

their items abroad. This practice adds to their manufacturing cost, not to mention additional delays incurred due to shipment of parts.

The MIRDC has recently acquired a Vacuum Carburizing Oil-Quench furnace for the conduct of R&D, and for the use of the M&E industry. With this modern equipment available at the MIRDC, local enterprises can cut cost and make more resources available to their business.



Vacuum Carburizing Oil-Quench Furnace

¹ Swapnil R. Nimbhorkar, Prof.B.D.Deshmukh. Effect of Case Hardening Treatment on the Structure and Properties of Automobile Gears. International Journal of Modern Engineering Research (IJMER) Vol.3, Issue.2, pp-637-641 March-April. 2013. ISSN: 2249-6645.

A.1.4 Defense and Security

Table 4. Completed R&D Project Focused on Defense and Security

Project Title	Implementing Division	Type of R&D/Source of Funding
Metallurgical Assessment of Cast 4140 Gun Frame's Linear Indication	MPRD	Contract Research, Precision Foundry of the Philippines, Inc.

A.2. We implemented projects within the approved timeframe.

The timeliness in the implementation of projects is being closely monitored by the Center's Planning and Management Division. A project is implemented within the approved timeframe for as long as the project duration is officially approved by the EXECOM/Governing Board/Approving Authority. Project extensions approved during implementation are considered as part of the approved timeframe. At the end of CY2018, the Center had ten (10) ongoing R&D projects, all of which were implemented within the approved timeframe.

The Center lauds the performance of the divisions involved in the implementation of its R&D projects: the Prototyping Division, the Materials and Process Research Division, and the Analysis and Testing Division. With their proactive execution of project activities, the Center is able to accomplish 100% of its target in 2018.

A.3. We formed partnerships with public and private stakeholders and international organizations.

The DOST-MIDC values the importance of partnerships and linkages in the effective and more beneficiary-centered implementation and completion of its projects and activities. We are proud to report that the Center's collective efforts regarding this target paid off really well, as reflected by our 100% accomplishment. In 2018, we were able to go forge 13 new partnerships and maintain 17 partnerships from the previous year.

The Center's R&D initiatives are focused on four (4) areas, namely: (1) Advanced Transportation; (2) Machine Building; (3) Materials and Minerals Processing; and (4) Defense and Security. Consequently, these are also the focus of our partnerships and all the Memorandum of Understanding (MOU), Memorandum of Agreement (MOA), and the Contract Research Agreements (CRA) that we sign as outputs of the partnerships that we get involved in.

A.3.1. Maintained Partnerships

The 17 partnerships that the Center was able to maintain from the previous year are indications of the DOST-MIRDC’s harmonious relationship with private and international organizations, with other government agencies, and with its long-time partners in the metals, engineering, and allied industries.

The Center commends the proactive efforts of various divisions for making these maintained partnerships possible. We find fulfilment in keeping the partnerships nurtured through the initiatives of the Materials and Process Research Division (MPRD), the Prototyping Division (PD), the Technology Diffusion Division (TDD), the Planning and Management Division (PMD), and the Office of the Executive Director (OED).

Among the 17 partnerships we maintained are the following highlights:

We give constant efforts to intensify the partnerships we inked with the industry, an initiative that began many years ago. Under the stewardship of former DOST Secretary Mario G. Montejo, our partnership initiatives were coined as ‘Makinarya at Teknolohiya para sa Bayan,’ or simply the MakiBayan. This was later changed to, ‘PartnerShape,’ which heralded the beginning of the current Secretary Fortunato T. dela Peña’s leadership of the DOST.

The 17 maintained partnerships are composed of MOUs, MOAs, and CRAs with various organizations, including our partner industry associations – the Philippine Welding Society (PWS), the Philippine Society for Non-destructive Testing (PSNT), the Metalworking Industries Association of the Philippines (MIAP), the Mechatronics and Robotics Society of the Philippines (MRSP), and the Aerospace Industries Association of the Philippines (AIAP).



(From top): Signing of Memorandum of Understanding (MOU) with Korea Institute of Machinery and Materials (KIMM); On-site inspection for the project Optimization of Austenitic Manganese Steel Liner for Philippine Aggregate & Mineral Processing with Electa Tarlac Aggregates Corp.; and Maintaining Partnership with the Industry Associations through MIRDC’s provision of Secretariat Office rooms.

A.3.2. New Partnerships

Equally fulfilling as the partnerships we maintained are the new ones which the Center was able to foster with various stakeholders in 2018. There is a total of 13 new partnerships signed, thanks to the unyielding efforts of the PD, the MPRD, the PMD, and the Finance and Administrative Division (FAD).

The new MOUs, MOAs, and CRAs signed in 2018 paint for us a more vivid picture of what the metals, engineering, and allied industries should be as they become more productive and globally competitive.

The 2018 highlights of the 13 new partnerships we signed are shown below:



(Photo-L) DENR EMB-NCR, Malabon LGU, DOST-MIRDC, and DOST- NCR ink a Memorandum of Agreement represented by (seated 3rd-6th from the left) DENR EMB-NCR Regional Director Domingo M. Clementa Jr., Malabon City Mayor Antolin A. Oreta III, DOST-MIRDC Executive Director Robert O. Dizon, and DOST-NCR Assistant Regional Director Arman P. Bionat for the Automatic Trash Rake Project at Letre Creek along P. Aquino Avenue, Bgy Tonsuya, Malabon City. Photo (R) shows on-site survey and documentation with Project Leader Engr. Gharry M. Bathan of DOST-MIRDC.



(L) Signing of Memorandum of Understanding (MOU) with Philtrack, Inc. to revive the Panay Railways, Inc.'s (PRI) railway system and (R) Development of alternative manufacturing process for the production of Stainless Steel Impeller for Small Fishing Boats..

A.4. We shared knowledge and technologies that result from R&D initiatives to stakeholders.

It is the Center's goal to share to our stakeholders the knowledge and technologies that result from our R&D initiatives. Dissemination of technology information is a strategy that we know will be basis for building the capabilities and upgrading technical know-how of the industry.



Engr. Florante A. Catalan (L), Engr. Nelson L. Tumibay (center), and Dr. Dominic S. Guevarra (R) present technical presentations on Thermal Scanning, Vacuum Carburizing, and Gear Making, respectively, during the M&E Conference.



Three technical experts: (from left) Mr. Volker Schmid, Mr. Shaun Lim, and Mr. Yves A. Lacayanga talk about modern technologies on Industry 4.0, Additive Manufacturing, and Robotics, respectively.

A.4.1. Metals & Engineering (M&E) Conference

The observance of the 2018 Metals and Engineering Week was bannered by the theme, ‘Partner-Shape 2018: Putting the M&E Industries at the Forefront of a New Industrial Revolution.’ It was an assembly of guests from the industry, the public sector, and the academe as well. Here, the Center presented its new capabilities, and invited industry experts to talk about modern technologies that are changing the landscape of the manufacturing industry. Table 5 summarizes the 2018 M&E Conference presentations.

Table 5. List of Technical Presentations during the 2018 M&E Conference

Presentation Topics Featuring the MIRDC’s New Capabilities	Resource Speaker from DOST-MIRDC	Position
1. Thermal Scanning	Engr. Florante A. Catalan	Supervising Science Research Specialist (Sup SRS)
2. Vacuum Carburizing	Engr. Nelson L. Tumibay	Senior SRS
3. Gear Making	Dr. Dominic S. Guevarra	Senior SRS
M&E Conference Technical Presentations	Guest Resource Speaker	Position, Affiliation
1. Industry 4.0	Mr. Volker Schmid	Manager, Asia Pacific and Greater China Festo Didactic
2. Additive Manufacturing	Mr. Shaun Lim	Strategic Business Development Manager, ASEAN Region Renishaw (Singapore) Pte. Ltd.
3. Robotics	Mr. Yves A. Lacayanga	Robotics and Application Engineer II, Omron Asia Pacific Pte. Ltd.

We were able to share with a total of 70 external participants the new capabilities of the Center. Along with the presentation of the new capabilities was the invitation to the local M&E industries to take advantage of

these new technologies to aid them in their business operations.

Above photos show our technical presentations during the 2018 M&E Week Conference.



Scenes from the MIRDC Booth where the S&T Services offered by the Center were presented through video showing of facilities such as the Die and Mold Solution Center; Gear Making Facility; Surface Engineering Facility; and Auto Parts Testing Laboratory.



The MIRDC showcases an architectural 3D modeling and visualization, video authoring, and interactive web application for the Hybrid Electric Train.

A.4.2. 2018 National Science and Technology Week

The National Science and Technology Week (NSTW) is one of the biggest events spearheaded by the DOST which showcases the complete spectrum of technologies and services offered to the public under various industries, for all walks of life.

The DOST-MIRDC actively participated in the week-long celebration of the 2018 NSTW held at the World Trade Center. Thousands of guests, composed of students, researchers, government employees, and entrepreneurs flock to the venue to see new and exciting technologies. We took advantage of this huge assembly of science, technology, and innovation enthusiasts to promote our technologies and services.

In this year's NSTW, we featured the Mass Transportation Program, particularly the Hybrid Electric Train (HET), and the facilities of the Center, namely: (1) Auto Parts Testing Laboratory; (2) Die and Mold Solution Center; (3) Gear Making Facility; (4) Finite Element Analysis Design Center; (5) Surface Engineering Facility; and (6) Investment Casting Facility. There are thousands

of guests who come to the NSTW every year to witness new and exciting technologies.

The Center also took advantage of the opportunity to discuss in greater detail through technology for the following: (1) the HET; and the (2) DOST-MIRDC Facilities in Support of the Metals and Engineering Industries, handled by Engr. Pablo Q. Acuin and Engr. Osric Primo Bern O. Quibot, respectively. The Center is proud to report that we were able to accommodate 52 participants for the HET technology forum, and 63 guests for the DOST-MIRDC Facilities forum.

A.4.3. 2018 Regional Science and Technology Week

Our active support and participation to the DOST-led science fair and exhibits took us to various regions all over the country in connection with the celebration of the 2018 Regional Science and Technology Week (RSTW). In 2018, we brought with us various technologies and services of the Center that will meet the peculiar requirements of different regions.

We experienced varying turnout of exhibit participants in different regions, but generally, RSTW participants are from the academe, the government, and the industry. These were opportunities for the Center to disseminate information about how its technologies and services can offer effective interventions for enhanced productivity and competitiveness.

Our participation to the RSTW enabled us to come face-to-face with more than 2,000 exhibit guests. We received various inquiries. Guests inquired about the technologies that they



Engr. Pablo Q. Acuin conducts forum on Hybrid Electric Train and Engr. Osric Primo Bern A. Quibot talks on DOST-MIRDC Facilities in Support of the Metals and Engineering Industries during the 2018 NSTW at the World Trade Center Metro Manila.

Table 6. List of Various 2018 RSTW Activities Participated in by the DOST-MIRDC

Region	Date	Municipality, Province	Venue
11	July 6-9	Lanang, Davao City	SMX Convention Center, Lanang
3	August 1-3	San Vicente, Tarlac	Bulwagan ng Kanlahi (Diwa ng Tarlak)
5	August 8-10	Legazpi City, Albay	Bicol University College of Industrial Technology Gymnasium
2	August 12-16	Gonzaga, Cagayan	Municipal Gymnasium
CARAGA	September 5-8	Butuan City, Mindanao	Robinson's Place-Butuan
10	September 12-14	Malaybalay City, Bukidnon	Bukidnon State University
1	September 18-21	Alaminos City, Pangasinan	Don Leopoldo Sison Convention Center
NCR	September 26-28	City of Manila	Unibersidad de Manila – Manila City Hall
12	October 3-5	Koronadal City, Cotabato	Cinco Niñas Convention
4B	October 9-11	San Jose, Occidental Mindoro	Seasons Hotel & Convention Center
CAR	October 22-25	Luna, Apayao	Municipal Gym, Apayao State College and PLGU Apayao Compound
9	November 6-8	San Miguel, Zamboanga Del Sur	Municipal Gymnasium
4A	November 12-14	Lucena City, Quezon Province	Quezon Convention Center
7	November 14-16	Tagbilaran City, Bohol	Island City Mall

can use in their business. Some requested copies of the technology videos. Others asked about training programs. There were others who approached with questions about availing technical services. A few raised concerns about their need for R&D. All these were reported to the concerned division who can give immediate and appropriate attention.

The Center values all these opportunities to personally speak with our stakeholders and attend to their inquiries on a more personal level. After all, we are after increased awareness of the industry in order to spark further interest. This is where we find effective entry points to make our services relevant to the needs of the industry.

A.4.4. The DOST-MIRDC Official Website

We maintain and regularly update the Center's website, www.mirdc.dost.gov.ph, so that information regarding our technologies and services are easily accessed by stakeholders. Our website is a very essential avenue for sharing knowledge and updates to the industry as it serves as a repository of publications. In addition to the DOST-MIRDC website, the Center is managing the Phil-

Met website that is accessed through <http://philmet.mirdc.dost.gov.ph>. The PhilMet was set-up to provide a marketing platform that showcases the local metals and engineering industries' exportation and service outsourcing capabilities.

The publications contained in the Center's website include the Annual Reports, Industry Studies, and scientific papers authored by our very own engineers and project members. Taking our Information, Education, and Communication (IEC) materials and press releases to the online world allows us to intensify our drive to raise the industry's awareness and involvement in the initiatives that we engage in.

The information dissemination efforts of the Center are working out the way we envisioned them to. Our proactive dissemination of information has resulted to more than a thousand downloads of available IEC materials and technical papers.

Aside from the number of downloads, data analytics of the Center's website reveal a significant number of engagement as shown in Figure 1.



Photos taken during the MIRDC's participation to different Regional S&T Week celebrations hosted by the DOST Regional Offices.

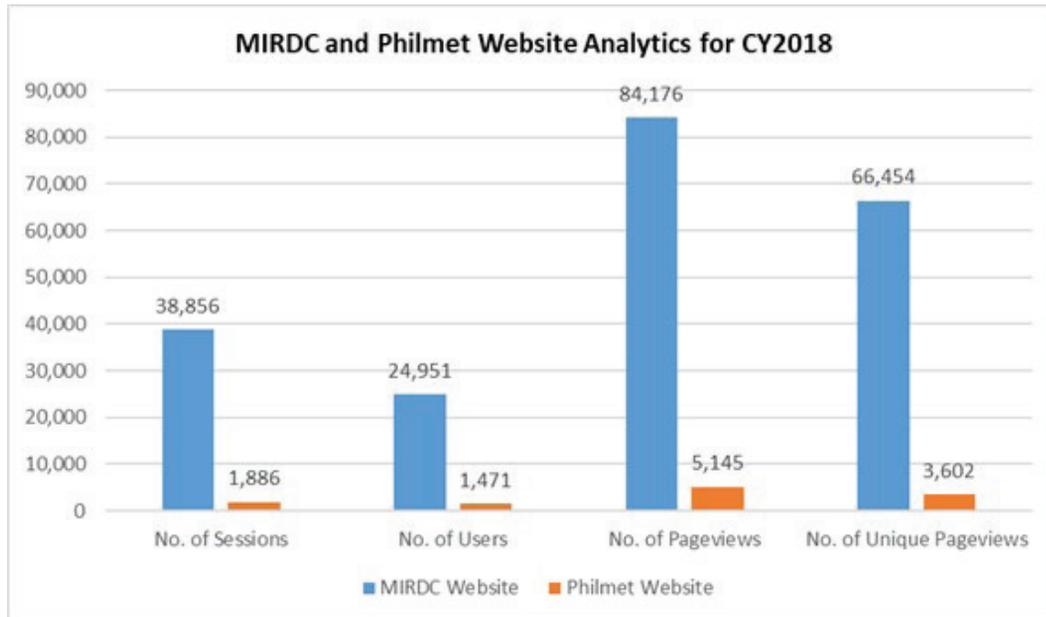


Figure 1. DOST-MIRDC and PhilMet websites analytics for CY 2018

A.5. We published technical papers in peer-reviewed journals, presented in national and/or international conferences, filed or secured approval of IP applications for projects completed.

Of the 261 R&D projects completed by the Center in the past five (5) years, 204 R&D outputs, equivalent to 78.16%, have either been adopted by the industry, published in peer-reviewed journals, presented in national or international conferences, or with IP filed or approved.

Our R&D activities enable us to generate technical papers authored by our very own engineers and project staff. Throughout the course of the entire 2018, project teams led by the Center's top engineers were able to carry out the task of writing technical reports as part of the R&D project implementation. Not only that, our engineers poured in efforts to have their papers published, and presented in international conferences.

The technical paper for the project entitled, 'Design and Finite Element Analysis of Customized Local Road Vehicles (CLRV):



Engr. Remartin S. Maglantay receives the Certificate of Presentation for his talk on the 'Design and Finite Element Analysis of Customized Local Road Vehicles (CLRV): The Case for the Tricycle and Philippine Jeepney' held in Korea on October 28-31, 2018.

The Case for the Tricycle and the Philippine Jeepney’ was peer-reviewed, published, and presented in the IEEE Region 10 (Asia-Pacific) Conference, TENCON 2018, held at the Ramada Plaza Hotel in Jeju, Korea, on October 28-31, 2018.

Meanwhile, the technical paper of three (3) of our R&D projects made it to the publication and presentation in the IEEE 10th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM 2018) held at the Hotel Supreme Convention Plaza, Baguio City, on November 30 – December 1, 2018. Below shows photos from the said conference.

These projects are the following:

- (1) Design of the Philippine Jeepney for Crashworthiness Analysis: A Finite Element Analysis Approach;
- (2) Performance Evaluation of a 12-hp 4-stroke Single Cylinder Diesel Engine Based on Philippine Standards; and
- (3) Rule-Based Energy Management Strategy for Hybrid Electric Road Train.

Aside from these, two (2) of the Center’s projects were presented in various conferences. These are as follows:

- (1) Technical and Economic Feasibility Study to Determine the Most Suitable Iron-making Technology for the Value-Adding of Philippine Magnetite Resources for the Iron and Steel Industry, presented in the Mineral Industry Symposium, 65th Annual National Mine Safety and Environment Conference, held in Camp John Hay Trade and Cultural Center, Baguio City, Philippines on November 22, 2018; and
- (2) The DOST Mass Transportation Program, presented in the Philippine Railway Modernization and Expansion Summit 2018, held at the Solaire Resort & Casino, in Pasay City on October 24-25, 2018. Column 2 shows photos of these presentations.

The Center is also consistent at aggressively pursuing for the protection of its Intellectual Property Rights (IPRs) with the best interest of the M&E industries in mind. Part of our R&D project deliverables are IPRs filed and approved. We are proud to have

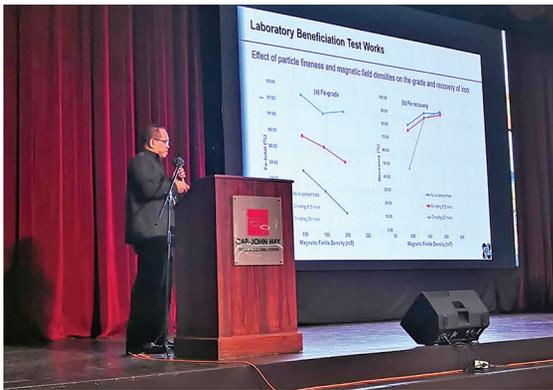


Engr. Remartin S. Maglantay (L), Engr. Jayson P. Rogelio and Engr. Allan John S. Limson (center), and Engr. Franz Joseph D. Libao (R) presented the technical papers of their respective R&D projects in the IEEE HNICEM 2018 held in Baguio City in December 2018.

filed five (5) IP applications in 2018: four (4) Utility Model applications, and one (1) Industrial Design application.

Details of the IP applications filed are shown in Table 7.

This year, we were also able to secure the approval of the IPR application of five (5) of our technologies. Table 8 presents the list.



(Left) Dr. Agustin M. Fudolig, MIRDC Deputy Executive Director for Technical Services, presents the Technical and Economic Feasibility Study to Determine the Most Suitable Ironmaking Technology for the Value-Adding of Philippine Magnetite Resources for the Iron and Steel Industry; while (Right, 2nd from the left) Engr. Jonathan Q. Puerto, MIRDC Deputy Executive Director for R&D, with co-project members: Engr. Pablo Q. Acuin, Engr. Rodnel O. Tamayo, and Engr. Rommel N. Coruña present the DOST Mass Transportation Program.

Table 7. List of IP applications filed by the DOST-MIRDC in 2018

Title of IP Filed	Type of IP	Registration No.
1. Automated Guideway Transit	Industrial Design	3-2018-000984
2. Potter’s Wheel for Throwing of Clay	Utility Model	2-2018-001352
3. Abaca Fiber Extractor	Utility Model	2-2018-001353
4. A Clay Molding Equipment for Jigging and Jollying Methods	Utility Model	2-2018-001354
5. Semi-permanent Coupler with Collapsible Element and Anti-Climbing Mechanism for Railway Trains	Utility Model	2-2018-001613

Table 8. List of Approved IP Assets of the DOST-MIRDC in 2018

Type of IP approved	Title of IP Assets Approved
1. Utility Model	Coach Assembly for the Automated Guide-way Transit System
2. Utility Model	Rolling Stock Assembly for an Automated Guide-way Transit System
3. Utility Model	An Elevated Guide-way Track for an Automated Guide-way Transit System
4. Utility Model	Wrought Iron Forming Equipment
5. Industrial Design	Road Train

B. Metals Industry Technology Transfer Program

Republic Act 10055, otherwise known as the Technology Transfer Act, is an act that provides ‘the framework and support system for the ownership, management, use, and commercialization of Intellectual Property generated from research and development funded by government and for other purposes.’ Technology Transfer is defined by RA 10055 as ‘the process by which one party systematically transfers to another party the knowledge for the manufacture of a product, the application of a process, or rendering of a service, which may involve the transfer, assignment, or licensing of Intellectual Property Rights (IPRs).

Technology transfer is one of the major thrusts of the Center. Being an RDI under the DOST, we actively and aggressively support the Department’s mission of translating to maximized socio-economic benefits for the people the scientific and technological efforts that it directs, leads, and coordinates. As an RDI that carries the sole responsibility of directly serving the metals, engineering, and allied industries, we see to it that we remain faithful and uncompromising in the delivery and effective implementation of our programs and activities.

B.1. We diffused knowledge and technologies.

The Center maintains active participation in Technology Transfer activities. Through its Technology Advisory and Business Development Section (TABDS), the Center was part of a series of Technology Transfer Activities facilitated by the Technology Application and Promotion Institute (TAPI). Owners, Presidents, and General Managers of various fabrication firms and DOST Regional Office representatives from Regions 5, 7, 12 and NCR attended the “TechGens Meet CEOs”



‘TechGens Meet CEOs’ held at the Tungsten Conference Room of the MIRDC’s Platinum Building on September 26, 2018. Functions and features of the Rice Transplanter Attachment for Hand Tractors and the Spray Dryer Equipment were discussed by the technology generators from both the DOST-MIRDC and the DOST-ITDI.



(L) Dr. Agustin M. Fudolig welcomes the participants of the MIRDC Technology Transfer Day. Technology pitching and negotiation sessions (Center and right).

last September 26, 2018. In another round of the said technology transfer scheme, held on November 5, 2018, participants and representatives from Regions 2, 4B, and 9 were present.

MIRDC Technology Licensing Officers presented the food processing technologies, namely: Freeze Dryer, Modular Water Retort, Spray Dryer and Vacuum Fryer, and the agricultural implements, namely: Rice Transplanter Attachment for Hand Tractors and Rice Harvester Attachment for Hand Tractors, developed by the Center. A brief tour of the Industrial Technology Development Institute (ITDI) Food Innovation Center and MIRDC Equipment Prototyping Shop was conducted wherein the fabricators and potential licensees were able to view the prototype units and inquire further on the design and features of the showcased equipment. A total of twelve (12) terms sheets were signed by various firms to signify their interest to license the said technologies.

The Center spearheaded the conduct of the Technology Transfer Day as part of the Metals and Engineering Week Celebration held at the Platinum Auditorium on June 20, 2018. Eighteen (18) technologies were presented before the invited participants from the equipment fabrication shops and other non-government organizations. Among the presented technologies are the following: Advance Transportation Systems, Rice Transplanter and Harvester Attachments for Hand Tractors, Retrofitting of Rice Mill for Brown Rice, Superheated Steam Treatment System, Sweet Sorghum Juicer, Integrated Wrought Iron Forming Machine, Tent Sys-

tems and the CNC Router for Furniture.

One of the Center's missions is 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 technician. Spearheaded by the Industrial Training Section (ITS) and its diligent staff, the DOST-MIRDC continues to deliver its mission hence, providing better opportunities for growth and development by strengthening skills and improving performance.

The Center was able to successfully diffuse knowledge and technology in 2018. The diffusion of knowledge came in the form of trainings, seminars, consultancy, techno demo, and exhibits.

We are glad to report that the trainings we offer – the regular, the packaged, and the regional training programs – helped the Center more than successfully achieve its targets. Table 9 summarizes this remarkable accomplishment of the Center.

We implemented additional 16 packaged and one (1) regional training program with a total of 521 participants. These also serve as the Center's Corporate Social Responsibility.

We facilitated the design of six (6) new training programs, namely: Introduction to Advanced Ultrasonic Testing: (PAUT), Awareness on Business Continuity Management System (Based on ISO 22301 Standard), Awareness Seminar on Environmental Management System (Based on ISO 14001:2015 Standard), Basic Spur and Helical Gear Design, Aluminum Anodizing and

Gear Making (Hobbing, Shaving, Shaping). The first three (3) mentioned programs are already included in the 2019 line-up of training programs.

A total of 768 firms (469 returning and 289 new) availed of the training programs with 4,146 industry personnel trained. Below are some snapshots of the training programs conducted by the Center's ITS.

A series of consultative meetings with Metro Manila Shipyard Association, Inc., Keppel Subic Shipyard, Metalworking Industries Association of the Philippines-Davao Chapter and Metals & Engineering Sectors of La Union & Pangasinan – Region 1 was held to assess the current training needs and requirements for human resource, to identify interventions thru training programs and establish a partnership for

future projects focused on developing the manpower of the metals industry. These activities allowed us to provide training services that are more fit to address the industry's training needs.

Table 9. List of Training Program Categories and the Number of Training Programs Conducted in the Regions, 2018

TRAINING PROGRAMS	NUMBER OF PROGRAMS IN THE REGIONS											TOTAL
	NCR	CAR	I	III	IV	V	VI	VII	X	XI	CARAGA	
Metal Casting Technology												0
Metalworking Technology	21	2	3	3	4		4	3	5	5	1	51
Analysis & Testing	47		1		1			3	1	1		54
Engineering, Production & Planning	14								1	3		18
Management/Productivity Improvement	14		2		1				1	1		19
Trainer's Training												0
Others	15		1		3				1	3		23
TOTAL	111	2	7	3	9	0	4	6	9	13	1	165



Here is a look at some of the DOST-MIRDC's training programs conducted for the M&E and allied industries in 2018 (upper row from left): Dimensional Metrology 2: Length Calibration hands-on/lecture with Mr. Eduardo V. Diasanta Jr.; Participants of the training program Application of CAD/CAM with the resource person, Mr. Augusto Atanacio Jr. and technical assistant, Mr. Simplicio Morla; and Dr. Danilo N. Pilar during his lecture on Internal Quality Audit with DOST Regional Office No. 8 participants. Lower row from left: Participants during the lecture / discussion on Industrial Calibration with the Resource Person, Engr. Franz Joseph Libao; Participants of the Shielded Metal Arc Welding during the hands-on training with the Resource Person, Engr. Reynaldo L. Dela Cruz Jr.; and Engr. Edilbert M. Dela Peña on his lecture on Heat Treatment of Steels.

SECTION 1: MAJOR OPERATIONS

Our consultancy services give us opportunities to connect more effectively with the industry players. The technical personnel of the Center from the different divisions

and sections rendered a total of two hundred thirty six (236) consultancy services and technical assistance to different firms from various industry sectors. Concerns re-



Consultative meetings with the industry (clockwise, from top left): with the Keppel Subic Yard at Subic, Zambales; with the Metro Manila Shipyard Association, Inc. in Navotas; with the Metalworking Industries Association of the Philippines-Davao Chapter (MIAP-DAVAO) in Davao del Norte; and with the Metalworking Industries Association of the Philippines-Pangasinan Chapter (MIAP-Pangasinan) at Calasiao, Pangasinan.

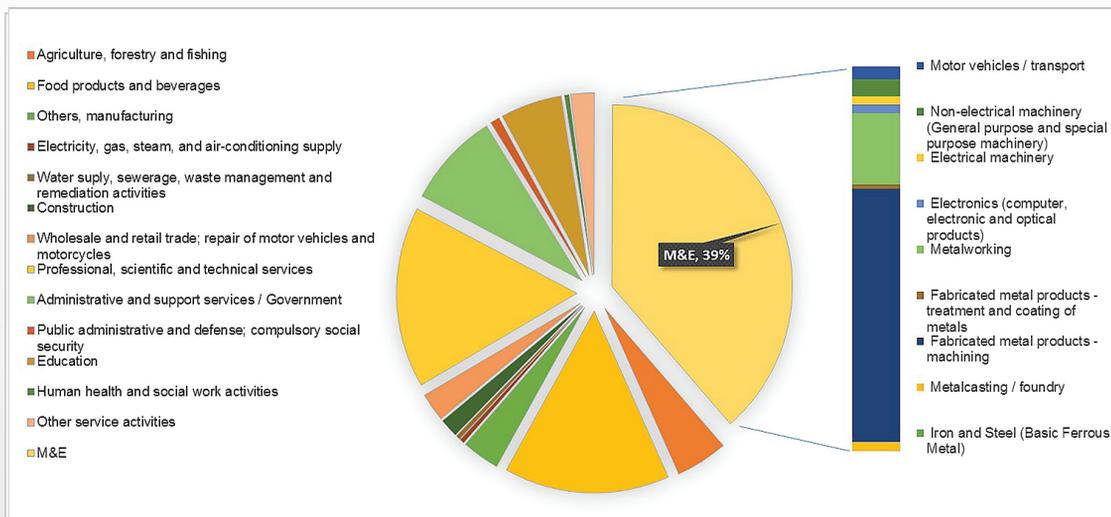


Figure 2. Technical Assistance and Consultancy Services Rendered per Sector, 2018

lated to food processing equipment, agricultural equipment, surface finishing, metalworking processes, metalcasting productivity programs and even thesis or feasibility studies were addressed.

Some of our consultancy services conducted in 2018 are as follows:

1. Technical Consultancy on Metalcasting Practices for the Mindanao Forge Company, Incorporated (MFCI) in Gingoog City, Misamis Oriental conducted by Engr. Mervin B. Gorospe and Mr. Elfred C. Teodosio of on July 11 – 17, 2018.

2. Technical Consultancy on Productivity Improvement and Facility Upgrading for Vivere Lifestyles Co., Inc. in Angeles City, Pampanga conducted by Mr. Osric Primo Bern A. Quibot and Engr. Rey N. Mariposque on March 22, 2018.

Vivere Lifestyles Co. manufactures lightings, furnitures and accessories under the brand, “Triboa Bay Living.” The products are sold to resort contractors, furniture retailers and interior decorators in the Asia Regions and other countries such as Europe, USA, South Africa, South America and Australia.

3. Technical Consultancy on the Transition of the Quality Management System of DOST Agencies and Private Firms from ISO 9001:2008 to ISO 9001:2015 Standard.

A company’s ISO 9001 certification brings benefits and impacts on the its overall improvement initiative, acquisition and retention of customers and improved company image. So much so that numerous organizations and firms seek the assistance of the Center’s ISO experts in the smooth transition of their Quality Management System (QMS) and to get certified to the latest version of the QMS standard: ISO 9001:2015.

In 2018, with the able assistance of MIRDC, three (3) private companies from the Aerospace, Metalcasting and Metalworking industries and one (1) DOST agency successfully acquired ISO 9001:2015 certification.



(Top to bottom) Mr. Elfred C. Teodosio demonstrates how to position a sprue in the sand mold; Critical points on melting during the pre-start-up operation of induction furnace; and MFCI Foundry personnel who participated in the lecture and demo activities.

Table 10. List of Assisted Private Firms and DOST Agencies Certified to ISO 9001:2015 Standard

REGION	NAME OF COMPANY	NATURE OF BUSINESS	DATE OF ENGAGEMENT
CAR	Aurochs Aerospace Precision Mfg. Corp. Loakan Road, Baguio City	Provides products/services to the Industrial, Automotive and Aerospace and Defense markets	July 28, 2018
NCR	Cherimel Philippines, Inc. Deparo, Caloocan City	Produces sheet metal fabricated products such as, ATM Kiosks, Customized Metal Cladding, Interactive Steel Kiosks, Data Cabinets, Server Racks, Steel Lockers, Steel and Stainless Cabinets, Tools Cabinet, Stainless Kitchen Tables, Electrical Enclosure, and customized sheet metal products. Other services include CNC Fiber Laser Cutting, CNC Turret Punching, CNC Bending, CNC Shearing, CNC plasma Cutting, Robot Welding, Assembly and Metal Stamping.	February – November 2018
NCR	Science Education Institute DOST Cpd., Bicutan, Taguig City	Mandated to: <ul style="list-style-type: none"> • Undertake science education and training; • Administer scholarships, awards and grants; • Undertake science and technology manpower development; and • Formulate plans and establish programs and projects for the promotion and development of science and technology education and training in coordination with DepEd, CHED and other institutions of learning. 	July – November 2018
VI	R.U. Foundry and Machine Shop Corp. Bacolod City, Negros Occidental	Caters to the casting, machining, and fabricating requirements of the Sugar Industry, Cement/Mining Factories, and Agro-Industrial Companies	March 19 – 21, 2018 May 30 – June 4, 2018



The Stage 2 (Implementation Audit) at the Science Education Institute, Bicutan, Taguig City conducted by the auditors of TUV-Rheinland on November 7, 2018. TUV-Rheinland auditors congratulates SEI for its successful certification to ISO 9001:2015 with zero nonconformity.

SECTION 1: MAJOR OPERATIONS



(L) Stage 1 Audit of Cherimel Philippines, Inc.'s QMS on October 23, 2018; (M) Stage 2 Audit on November 13, 2018; (R) CPI's EVP Nathaniel Cu and employees together with NQA's auditors and Engr. Mervin B. Gorospe during the announcement of successful certification to ISO 9001:2015 with zero nonconformity on November 13, 2018.



(L) RUFMSC's top management receives final coaching from MIRDC's Ms. Linda G. Rivera; (M) TUV-Rheinland Auditors (far-right) together with the top management during the surveillance audit. (R) TUV-Rheinland Auditor auditing the Assembly and Quality Inspection Section of RUFMSC..

The Center also diffuses its technologies through MIRDC-led exhibitions. Throughout 2018, the Center was unstoppable in its efforts to organize S&T exhibitions through the support of the Center's Technology Diffusion Division-Technology Information and Promotion Section (TDD-TIPS). Technology exhibits were conducted during

the MIRDC Goes to the Countryside, an activity held twice in 2018: one in Tagum City, Davao del Norte and the other in Iligan City. The Center's exhibits were again featured during the 2018 M&E Week Celebration to highlight the technologies ripe for adoption and commercialization.



MIRDC Goes to the Countryside, Davao City (above) and Iligan City (below).





'Naghihintay' and 'Sana' are two promotional videos of the Hybrid Electric Train that took advantage of the online platform to raise the public's awareness of the Filipinos' capability to make our very own train.

Box 1

We are rolling in 3...2...1...!

The promotional videos of the HET may be viewed by any netizen, whenever he wishes to, wherever he is. Thanks to the power and reach of the internet. 'Naghihintay' and 'Sana' rode on the popularity of love stories among the Filipino audience. Playing lead roles are Engr. Pablo Q. Acuin, Project Leader of the HET, and Ms. Venus Agad, a lovely talent we tapped from the Center's Analysis and Testing Division.

The videos are just, as they say, the tip of the iceberg. There is more – so

much more – that the public did not see. The entire experience of coming up with promotional videos, packaged in a way that will appeal to even the non-technical audiences, called for dynamic and flexible capabilities that challenged Team MIRDC. Conceptualizing, mobilizing people, coordinating with the appropriate offices, actual video shooting, and post-production matters were no easy tasks. It was indeed challenging – but the finished products were all worth it. Let these behind-the-scenes photos show what Team MIRDC is all about.

Lights. Camera. ACTION!

Aside from conducting technology exhibits, we also took advantage of the power of the online world. The Center produced two (2) promotional videos of the Hybrid Electric Train (HET) through the initiative of the TIPS. 'Naghihintay' was launched in March 2018, while 'Sana,' its sequel, was released four months after. These were uploaded on social media and gained a large viewership.



Behind the scenes of the promotional videos of the Hybrid Electric Train.

B.2. We transferred/commercialized technologies through tech transfer agreement.

As a result of the different technology promotion and transfer activities, the Center inked licensing agreements on the commer-

cialization of six (6) technologies on food processing and agricultural implement for rice transplanting and harvesting in 2018. To date, MIRDC has a total of twenty (20) Technology Licensing Agreements on the said technologies with various firms. These transferred technologies are as follows:

Table 11. List of Technologies and Licensed Fabricators, 2018

TECHNOLOGY	REGION	NAME OF LICENSEES
1. LPG Fired Spray Dryer 	II III VII	Agricomp Machineries & Construction Corp. Alltrade Marketing & Mfg. Corp. Food Machinery Industrial Corp. VIRCAP Light Metal Industries Ralds Trading & Electromechanical Services Corp.
2. Freeze Dryer 	II III	Agricomp Machineries & Construction Corp. Alltrade Marketing & Mfg. Corp. Food Machinery Industrial Corp.
3. Modular Water Retort 	II III VII	Agricomp Machineries & Construction Corp. Alltrade Marketing & Mfg. Corp. Food Machinery Industrial Corp. Ralds Trading & Electromechanical Services Corp.
4. Vacuum Fryer 	III VII	Alltrade Marketing & Mfg. Corp. Food Machinery Industrial Corp. VIRCAP Light Metal Industries Ralds Trading & Electromechanical Services Corp.
5. Rice Transplanter Attachment for Hand Tractor 	III	Food Machinery Industrial Corp. VAL-Agri Machineries RMD Machine Shop
6. Rice Harvester Attachment for Hand Tractor 	III	Food Machinery Industrial Corp.

C. Metals Industry Science and Technology Services Program

With innovation at the core of the country's strategic policies and programs, the manufacturing, agriculture, and services sectors will grow more globally competitive while their linkages into domestic and value chains will be stronger. This is what the Philippine Inclusive Innovation Industrial Strategy (i³S) is all about. Prioritized in the i³S are the following

industries: (1) automotive; (2) electronics and electrical; (3) aerospace parts; (4) chemicals; (5) iron and steel and tool and die; (6) garments, textiles, and furniture; (7) shipbuilding; (8) tourism; (9) IT business process management particularly knowledge outsourcing and e-commerce; (10) agribusiness; (11) construction; and (12) infrastructure and

logistics. The private sector is truly seen as the driving force that will lead to the success of the i³S. It is the role of the government, however, to lay down coordinating policies and provide the necessary support measures that will bring all the i³S goals to fruition.

The DOST-MIRDC takes pride in the Technical Services it extends to the industry. We make it a point not to limit our services using conventional methods but also to utilize other methods because we aim to really be of relevant support to the industry. Our facilities are versatile – we assess the customers' requirements and provide the most appropriate response.

With regard to delivery of technical services, our most dependable personnel from the Analysis and Testing Division (ATD), as well as the Technology Diffusion Division (TDD) take the frontline. Below are the highlights of the Center's impressive delivery of technical services for the industry in 2018

The various laboratories and facilities of the ATD continuously supply the testing requirements of the Conformity Division of the Bureau of Philippine Standards (BPS). Annual assessment of the laboratories that support the BPS testing needs are being conducted. Last October 11, 2018, aside from the typical testing needs already provided by the PLS for product conformity assessment, additional tests for other products are included. The tire endurance testing is included to support the BPS conformity assessment group. This is to ensure that all



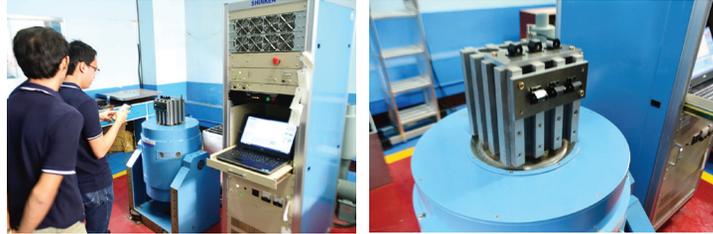
The DOST-MIRDC's PLS, represented by Engr. Florante A. Catalan and Engr. Karl Andrew S. Chavez, undergo audit by the Product Conformity Assessment Group of the BPS on October 11, 2018.

pneumatic tires traded locally are in conformance with the minimum requirement of the standard

Below is a rundown of some of the major achievements of the Center through its ATD labs and facilities:

- a. We conducted a study on the tensile characteristics different types of joining of Quenched and Tempered deformed steel bars. Different types of tests were conducted to each sample to determine its property and how they behave under tensile load.
- b. The Center's Auto-parts Testing Laboratory (ATL) was featured in the Center's

major undertakings in 2018. Vibration analysis of products and components that will be exposed to shaking and vibrations during transport and actual use are now available at the Center. Some samples that underwent vibration analysis this year are the ‘internal pinion counters’ used in the slot machines at the casino. These samples were tested at different axis using different vibrational parameters to ensure durability of the product during operation.



Vibration Testing of Internal Pinion Counter of Line Seiki Phils., Inc.



Weight of dummy weights determined using the load cell digital display (left), dummy weights are used to provide full load on steel racks (right).

c. Likewise, the ATL’s 5-tons Load cell was used for the conduct of the Deflection Test at the Suerte Steel Corporation, Trece Martirez City, Cavite.

d. Despite the renovation of the Mechanical Metallurgy Laboratory that started in the second half of the year, we accomplished more than 1,140 jobs in 2018. This includes providing technical services in different sectors such as academe, transportation, communication health, sports and metals and engineering.

d.1. We tested the materials for the construction of the new athletic stadium, such as plates and bolts, to be used in the upcoming 2019 Southeast Asian Games. The new Sports Complex will be located in Capas, Tarlac.

d.2. We were involved in the testing of Agapay Prototype. The prototype aims to assist the stroked patients in their movement while in their recovery stage. The project is headed by the alumni of the De La Salle University.

d.3. We supported the students of the Batangas State University thru the testing of load cell under the thesis title, ‘Design and Development of an Automated Brinell Spherical Indenter.’ The project’s objective is the automation of Brinell Hardness Test.

d.4. We conducted micro Vickers hardness test on glass cellphone screens to determine if these materials satisfy the complicated requirement of minimum hardness to resist scratch during



Materials to be used for the construction of the new athletic stadium to be used for the 2019 Southeast Asian Games tested at the MIRDC (left); MIRDC personnel conducts testing of the Agapay Prototype (center); and MIRDC assists students of the Batangas State University in the conduct of the load cell testing (right).

SECTION 1: MAJOR OPERATIONS



Glass cellphone screen undergoes micro Vickers hardness test (left); Bag Ring Comp is subjected to a breaking load test (right).

use. The glass is used in Samsung cell-phones J7 model.

d.5. We conducted a breaking load test on a Bag Ring Comp. This is a component of an Airbag for the safety of vehicles during collisions.

d.6. Through the NDT Laboratory, we served as third party testing body to private companies and different industries. Different methods of testing had been implemented such as Phased Array, Ultrasonic Testing, Liquid Penetrant testing, Magnetic Particle Testing and Radiographic Testing.

d.7. Our NDT Team conducted Liquid Penetrant Testing for over-head water tank of MIRDC to check and ensure the quality of welding if these were compliant to the standard.



The NDT team conducts Liquid Penetrant testing of the overhead water tank of the MIRDC.

d.8. We performed Magnetic Particle Testing (UV light) on the drill rods of the Maynilad water system projects to ensure that there are no defects in the thread so that they can perform their job continuously without delay due to detachment of some parts of drilling system.

d.9. We conducted the Visible Magnetic Particle Testing of the wire mesh post and base plate, used as mechanism for the prevention of erosion, to ensure the quality of welding.

d.10. We conducted the Magnetic Particle Testing (UV Light) for Crack Test of Pistol in support of the Armed Forces of the Philippines (AFP), the Philippine National Police (PNP), the Bureau of Jail Management and Penology (BJMP), and other government agencies and local industries.

d.11. Our non-destructive on-site testing service using the portable X-ray Fluorescence (XRF) Spectrometer on samples such as transmission line of a television network, safety cage ladder and handrails for waste treatment facility, and sanitary water tank of a pharmaceutical company continued to benefit the Center's loyal customers coming from various industries.



Drill rods of the Maynilad water system projects undergo Magnetic Particle Testing (left), and Visible Magnetic Particle testing is conducted to ensure quality of welding (right).



(L) Pistol undergoes magnetic Particle Testing (UV Light); and(R) MIRDC personnel conduct of on-site testing of handrail in a water treatment plant.

SECTION 1: MAJOR OPERATIONS



MIRDC conducts dimensional inspection of motor vehicle license plates.

e. Numbers do not lie. The Center, through its Instrumentation and Metrology Section (IMS) served a total of 813 companies from the metals and engineering industry, as well as those from the aviation and automotive industries.

e.1. We extended the IMS calibration services to other government agencies: the DILG-BJMP for the dimensional inspection of hand cuff and baton; the Department of Social Welfare and Development (DSWD) and the National Disaster Risk Reduction and Management Council (NDRRMC) for the dimensional inspection of different kitchenware; and the DOTr-Land Transportation Office (DOTr-LTO) for the dimensional inspection of motor vehicle license plates.

e.2. We were able to serve 2,403 jobs which correspond to 10,436 samples under the Instrumentation Lab (INS) and Metrology Lab (MTR). Despite of the on-going renovation, the IMS was able to generate an income amounting to Php 9.1M. IMS staff with their determination to serve the industry, the suspended services were resumed by satisfactory complying the requirements of Philippine Accreditation Bureau (PAB) Special Assessment On-Site Audit. New PAB approved signatories were Engr. Franz D. Libao, Engr. Christian Ibanez, Mr. Sam A. Ysit and Ms. Mary Joy R. Barona.



MIRDC extends calibration service of Rockwell Hardness Tester (left); and calibration service of Wire Cut Machine to private companies who require such technical services.

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

A. Accomplishments for the Metals Industry from other DOST-MIRDC Support Activities

A.1. We had a successful transition to the new PREXC structure.

The Department of Budget and Management (DBM) started implementation of the Program Expenditure Classification (PREXC) in CY 2018. The PREXC strengthens the link between planning and budgeting by clearly articulating how the Center's strategies, plans, and programs are anchored to the realization of the desired socio-economic result of increasing benefits to Filipinos from scientific knowledge and technologies in cutting-edge metals and engineering innovations.

With the changes implemented by the DBM, the Planning and Management Division (PMD) guided the Center's Management Committee (ManCom) and supervisors from the different delivery units in the transition to the new budget structure.



Deployment on 16 March 2018 held at the Titanium Auditorium, Titanium Building, MIRDC.

Mid-Year Review and Planning (MYRP) on 24-25 July 2018 held at Mercury Conference Room, Gold Building, MIRDC.





Year-end Review and Planning on 14-15 November 2018 held at Mercury Conference Room, Gold Building, MIRDC.

The PMD spearheaded a series of meetings in 2017 to provide a holistic view and rationale behind the adoption of PREXC and discussions on how changes will affect the Center's performance indicators. In 2018, the regular deployment of the Center's plans and programs as well as periodic planning sessions were conducted to further understanding of PREXC and monitor the Center's performance.

Below are the highlights of PMD-led activities in 2018:

1. Deployment – a General Assembly held on March 16, 2018 for the presentation of 2017 accomplishment, and deployment of 2018 plans and programs.

2. Mid-Year Review and Planning (MYRP) – attended by the Top Management staff on July 24-25, 2018, this is where physical and financial accomplishments of performance targets were reviewed. Issues and concerns,

as well as strategies to attain unmet targets were discussed. A half-day financial planning session was also conducted to discuss financial targets for the second semester and strategies on how to improve the Center's budget utilization rate.

3. Year-end Review and Planning (YERP) – this was the planning session held on November 14-15, 2018 for the discussion of physical and financial plans for CY2019. In anticipation of the implementation of the cash-based budgeting system, a half-day session focused on financial planning to support the attainment of physical targets for CY2019. Prior to the YERP, PMD also facilitated the conduct of Directorate planning meetings.

Table 12. DOST-sponsored trainings participated in by the DOST-MIRDC's PMD personnel in 2018.

Trainings	Participants	Date	Provider/Venue
<i>Course on Monitoring and Evaluation for the Department of Science and Technology (DOST)</i>	<i>Rea C. Castro, POIII Sheena S. Bedis, POIII</i>	<i>June 27-29, 2018</i>	<i>DAP¹, Tagaytay City</i>
<i>Technical Writing Course on Statistical Reports</i>	<i>Anthony Greg F. Alonzo, POIII</i>	<i>July 23-27, 2018</i>	<i>PSRTI² at 7th Floor South Insula Condominium, Quezon City</i>
<i>Policy Analysis and Development Workshop for the Department of Science and Technology (DOST), batch 1</i>	<i>Restituto G. Gabuya, POIV</i>	<i>October 1-5, 2018</i>	<i>NCPAG-CPED³, University of the Philippines – Diliman, Quezon City</i>
<i>Data Visualization Using Infographics</i>	<i>Ma. Rodesa Grace A. Mercado, POII</i>	<i>November 19-23, 2018</i>	<i>PSRTI</i>
<i>Integrated Policy Development and Strategic Planning for the Department of Science and Technology (DOST)</i>	<i>Restituto G. Gabuya, POIV Anthony Greg F. Alonzo, POIII</i>	<i>December 10-12, 2018</i>	<i>NCPAG, University of the Philippines – Diliman, Quezon City</i>

A.2. We actively participated in the Capability Upgrading of DOST Planning Officers.

The DOST issued Administrative Order (AO) 003 in 2017 to institutionalize 'Science for the People,' a tag line that captures the Department's strategic direction under the leadership of Secretary Fortunato T. dela Peña. We ensured that our plans and programs are aligned with and responsive to the priorities set by DOST. In order to do so, we further enhanced our capabilities in the areas of planning, policy development, and monitoring and evaluation participating in various DOST-sponsored trainings conducted in 2018. Table 12 lists the capability upgrading activities we joined in.

A.3. We coordinated events.

The Center, through the very proactive and dynamic facilitation of the TIPS, made its presence felt by the industry through holding focus group discussions (FGD) for the M&E and allied industries. FGDs are avenues for sharing of insights and suggestions from the industry, so that these are incorporated in the action plans, as well as in programs and projects of the Center. In 2018, we were also successful in reaching out not only to the industry, but to the academe as well. The Campus Talk allowed us to touch base with the young minds – our future engineers, scientists, and researchers who will add to the pool of fresh talents that we must groom and prepare for the challenges that the industry will face.

¹ DAP – Development Academy of the Philippines

² PSRTI - Philippine Statistical Research and Training Institute

³ NCPAG-CPED - Center for Policy and Executive Development (CPED) of the National College of Public Administration and Governance (NCPAG)



A.4. We released and disseminated publications.

The Center is taking its mission to engage in information exchange, and technology information dissemination and promotions seriously. That is why we remain aggressive in distributing information, education, and communication (IEC) materials to our partners and stakeholders to raise their awareness of updates on R&D outputs and technical service offerings of the Center.

Shown in the photo above are some of the publications of the Center in 2018.

A.5. We developed industry studies.

As part of the delivery of the Center’s commitment to directly assist the metals, engineering, and allied industries, we regularly conduct survey of the metalworking industries, focusing alternately on particular in-

dustries of the M&E. In 2018, the industry survey activities of the Center focused on the machining, the die and mold, and the forging businesses.

With great pride, the Center was able to complete all three surveys. This activity, made possible through the proactive and strategic implementation of the TIPS and the strong support of the industry, allowed us to reconnect with the industry players themselves. Our interviews led to the discussion of business operations, challenges, past accomplishments, technological capabilities, among others. The industry study reports, like previous publications of the Center, will be used as reference material of various audiences: the industry, policy-makers, academe, and researchers, to name a few. These publications will allow us to reach out to more businesses that bring life to the M&E and allied industries.



Survey team in action

A.6. We intensified technology promotions through media engagements.

To us, promoting and boosting the awareness of the public of our R&D initiatives and technology offerings is always a serious matter, and we never take things sitting down. The Center firmly believes in the power of the media in reaching out and capturing the interest of many of its stakeholders. In 2018, we exploited various information dissemination platforms of the media: print, TV, radio, and online news.

Among our stories featured on the news are the following:



Interview with Engr. Pablo Q. Acuin for Failon Ngayon (left); the HET story is featured in the Philippine News Agency website (center); and the R&D project utilizing the Center's heat treatment facility to determine parameters in the annealing of brass for the benefit of the country's gong fabricators is featured in the Philippine Information Agency website.

B. Human and Financial Resource Management

B.1. We take pride in our human resource.

The DOST-MIRDC has filled up a total of two hundred eighteen (218) technical and non-technical positions by the end of the year 2018. This created a 96.46% sustained human resource based from its 226 approved plantilla positions, with a 0.33% increase

from last year. This included several manpower movement that resulted to the conferment of twelve (12) newly hired personnel, seven (7) promoted staff and two (2) employees separated from government service due to retirement.

In brief, MIRDC's human resource capital is distributed accordingly as follows:

	Research and Development				Technical Services		
	OED	MPRD	PD	PMD	ATD	TDD	FAD
Engineers	3	10	17	0	9	14	3
Non-Engineers (Technical)	1	20	28	14	25	0	0
Admin/Support/Non-Technical	2	2	3	5	3	19	40
TOTAL	6	32	48	19	37	33	43

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

New Personnel:



Mary Louise C. Alvarez
Administrative Assistant I
Planning & Management Division



Deborah Jaynmerci D. Balota
Administrative Officer IV
Finance & Administrative Division



Jose D. Berces III
Production Cost Estimator II
Prototyping Division



Jason S. Candil
Metals Technologist II
Prototyping Division



Denise Daryl A. Florante
Science Research Specialist II
Prototyping Division



Eugene P. Guevara
Metals Technologist II
Materials & Process Research Division



James Patrick L. Lopez
Laboratory Inspector II
Analysis & Testing Division



Virgilio Y. Macanip, Jr.
Draftsman II
Prototyping Division

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT



Faith P. Macatangay
Administrative Officer I
Technology Diffusion Division



Carmelo O. Ricafort
Laboratory Technician I
Analysis & Testing Division



Randy E. Songahid
Administrative Aide VI
Materials & Process Research Division



Arnel T. Tuville
Administrative Aide VI
Finance & Administrative Division

Promoted Personnel:



Felix C. Banawa
Metals Technologist IV
Materials & Process Research Division



Eunice A. Bautista
Administrative Officer IV
Planning & Management Division



Sheena S. Bedis
Planning Officer III
Planning & Management Division



Karl Andrew S. Chavez
Science Research Specialist II
Analysis & Testing Division



Edward A. Malit
Senior Science Research Specialist
Analysis & Testing Division



Jeffrey C. Obregon
Science Research Specialist II
Analysis & Testing Division



Amado Jr. D. Tagal, Jr.
Metals Technologist IV
Prototyping Division

As the new generation of MIRDC personnel ventures into the beginning of their appointment in the science and technology sector, there are some who have reached the summit of their public service and started to delve into their own personal endeavor. Hence, MIRDC duly recognizes the valuable contribution of its outgoing personnel during their length of service in the public sector:



Felix C. Banawa
Metals Technologist IV
Materials & Process Research Division
25 Years & 8 Months



Maria Gracia M. Peralta
Supervising Science Research Specialist
Materials & Process Research Division
21 Years & 9 Months

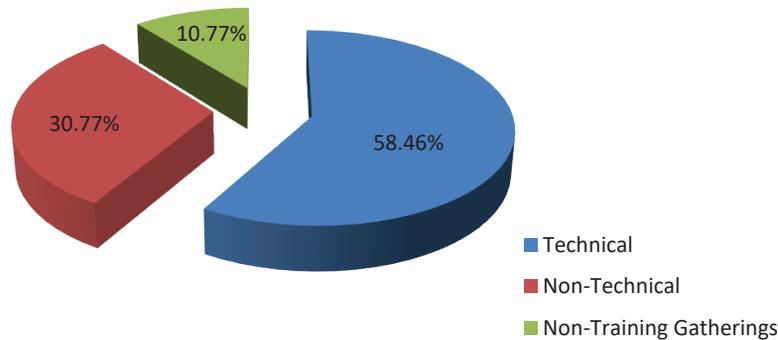
B.2. We implement annual learning and development programs.

The Finance and Administrative Division's Administrative and General Services Section (FAD-AGSS) have once again surpassed its target for MIRDC's Annual Learning Development Plan (ALDP) by 104.84%. From the sixty two (62) ALDP target programs, a total of sixty five (65) local training pro-

grams were implemented. This is exclusive of the eighty nine (89) unplanned local and foreign training programs facilitated by FAD-AGSS during the year.

Programs implemented were classified as Technical (38 programs), Non-Technical (20 programs) and Non-Training Gatherings (7 programs). The percentage distribution based on the total of 65 programs is illustrated as follows:

% Distribution of Programs Per Classification



The attainment of the Annual Learning and Development Program's Target for 2018 is attributed to the contribution of the Center's Subject Matter Experts (SME) in conduct-

ing a total of twelve (12) In-House training programs. In acknowledgement of their constant dedication, MIRDC salutes these contributors:

Subject Matter Expert	Training Program/s Conducted	Date Conducted
Dr. Danilo N. Pilar	Awareness Seminar on ISO 9001:2015 Internal Quality Audit	February 15, 2018 March 19-21, 2018
Atty. Trixie Hazel T. Veluz	Awareness Seminar on Risk Management	March 27, 2018
Engr. Rodnel O. Tamayo	IRR of RA 9184 (Government Procurement Law)	August 02, 2018
Engr. Reynaldo L. Dela Cruz Jr.	Electrical Calibration	August 14, 2018
Engr. Fred P. Liza	Seminar on Occupational Safety	September 19, 2018
Engr. Allan John S. Limson	Advance Manufacturing Systems and Gear Box Technology	November 9, 2018
Engr. Joseph Alfred V. Garcia		
Engr. Joiein L. Luces		November 16, 2018
Mr. Jeffrey C. Obregon	Rockwell Hardness Testing Verification of Awareness on Environmental Management System (Based on ISO 14001 Standard)	December 5, 2018
Ms. Jocelyn F. Dime	Trainer's Training: Effective Presentation Skills	December 12-14, 2018
Ms. Ma. Elena G. Gurimbao		
Dr. Concesa T. Cortez		
Dr. Jelly N. Ortiz	Employees Orientation/ Reorientation Leave Administration Orientation	December 17, 2018 December 18, 2018

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Added to this were the sixteen (16) customized training programs conducted by outsourced training providers funded by MIRDC, DOST-Human Resource Devel-

opment Program (HRDP) and the different on-going Research & Development Projects of the Center.

Program Title	Training Provider	Source of Fund	Date Implemented
1. Scientific Writing for MIRDC Researchers	Dr. Genaro Japos	Development of a Commercial Prototype Automated Guide-way Transit System in UP Diliman	January 29 – February 2, 2018
2. Basic End-User's Training Seminar (Thermal Image/Scanner)	Ms. Marites G. Feliciano Chromar Uni-Trade	MIRDC-ALDP	February 19, 2018
3. Fire Fighting Training	FO3 Francis Dominic D. Cledera FO3 Am Jerico C. Benitez Taguig Fire Station - Bureau of Fire Protection	MIRDC-ALDP Urduja Security Services, Inc.	April 5, 2018
4. Intellectual Property (IP) Training Series – FOUNDATION COURSE	Intellectual Property Office of the Philippines (IPO Phil.)	MIRDC-ALDP	April 18-19, 2018
5. Training on Patent Search	Intellectual Property Office of the Philippines (IPO Phil.)	MIRDC-ALDP	May 22-24, 2018
6. Seminar on Stress Management	Dr. Cely D. Magpantay St. Luke's Medical Center	GAA (General Appropriation Act)	May 31, 2018
7. Data Privacy Seminar/ Training	KPMG R.G. Manabat & Co.	MIRDC-ALDP	July 5, 2018
8. Information Security Awareness	KPMG R.G. Manabat & Co.	MIRDC-ALDP	July 6, 2018
9. Training on Patent Writeshop	Intellectual Property Office of the Philippines (IPO Phil.)	MIRDC-ALDP	August 7-9, 2018
10. Basic Records and Archives Management	National Archives of the Philippines	MIRDC-ALDP	August 16-17, 2018
11. Organizational Development: Enhanced Readiness for Tomorrow's Challenges	Development Academy of the Philippines	DOST-HRDP	September 3-7, 2018
12. Quality Customer Service Seminar/ Workshop	Mr. Jesus Villamor IV Department of Trade and Industry (DTI)	MIRDC-ALDP	September 25-26, 2018
13. Information Security Management System (ISMS) Awareness Training	Mr. Richard Regelado EIAN Mngt. Consulting Services	MITHI Project	October 11, 2018
14. Information Security Management System (ISMS) Risk Assessment Training/ Workshop	Mr. Richard Regelado EIAN Mngt. Consulting Services	MITHI Project	October 29, 2018
15. Information Security Management System (ISMS) Risk Treatment Training/ Workshop	Mr. Richard Regelado EIAN Mngt. Consulting Services		November 19, 2018
16. Capability Training on the Advanced Source Code Programming Using MERN	Mr. Billy Wilson A. Arante Mr. Paul Jan Saracho	MITHI Project	December 3-7, 2018

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

One of the major highlights of the Learning and Development Program for CY 2018 was the five-day Training Workshop for the specialized training course, entitled “Organizational Development: Enhanced Readiness for Tomorrow’s Challenges,” which was held last September 3-7, 2018. This was approved and funded by the DOST-Human Resource Development Program (HRDP) and was organized in partnership with the Development Academy of the Philippines’ (DAP) Center for Organizational Development (COD).

The program officially commenced with DOST’s Undersecretary for Scientific and Technical Services, Dr. Carol M. Yorobe, delivering the opening remarks at the Titanium Auditorium. Among the participants were officers and staff of the DOST system who are members of respective Change Management Committees, managers/ supervisors, human resource leaders and administrative officers handling people.

The workshop focused on developing organization capability through alignment of strategy, structure, management processes, people, rewards and metrics, giving emphasis to improving capacity for solving problems and managing future change. Given the

continuing growth and needs in the various scientific and technological fields including the metal industry in the Philippines, the DOST system was pressed to respond to the industry’s growth not only by coping organizationally, but developing an organization that is proactive and dynamic enough to respond to its ongoing progress and geared towards maximum economic and social benefits for the people.

It also enabled the participants to focus on the various theoretical framework of the course and immerse themselves on the applications to the planning and implementation of OD initiatives, recognize individual development areas to work toward closing the existing gaps as they apply parameters that were adopted in the training. Valuable insights were imparted by various speakers of DAP’s COD based on their extensive experience on leadership and management that were highly appreciated by the participants. These inputs together with the aim to further professionalize the government service and mold government managers and executives toward the desired transformational leader persona that they are expected to be garnered an overwhelming positive feedback.

MIRDC delegates during the Organizational Development training workshop



SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Another highlight for the learning and development program this year were the workshops regarding Intellectual Property Training Series which consist of (1) IP Training Series - Foundation Course held last April 18 to 19, 2018, (2) Training on Patent Search conducted last May 22 to 24, 2018 and (3) Training on Patent Writeshop held last August 7 to 9, 2018. Through the initiative of the MIRDC-Human Resource Development Committee and in cooperation with the Intellectual Property Office of the Philippines (IPO Phil), the objectives to address the training needs of MIRDC's research and development invention, innovation and their utilization through the development of IP-skilled science personnel were successfully carried out in the seminar.

MIRDC and IPO Phil's common goal is developing IP-skilled personnel that would specifically equip the Center's researchers with working knowledge in effectively conducting patent search, translating R&D output into quality patent grants, make patent information as basis for R&D activities, increase utilization of patent search databases and quality of patent filings.

Participants actively took advantage of the opportunity to learn as Engr. Virginia F. Aumentado (IP Rights Specialist V), Engr. Wilfredo Calaguan (IP Rights Specialist IV), Engr. Luwin Dela Concha (IP Rights Specialist IV), and Atty. Jesus Antonio Ros (IP Rights Specialist V) all shared their expertise during the event.



Ms. Aurea T. Motas and Dr. Agustin M. Fudolig with the speakers from the Intellectual Property Foundation Course



Intellectual Property Foundation Course

Patent Writeshop Training

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Aside from the planned learning and development programs, the FAD-AGSS facilitated ten (10) foreign travels and thirteen (13) scholarship programs. The following tables show the detailed List of Foreign Training and Non-Training Programs implemented and the Summary of New and On-Going Scholarship Programs CY 2018.

List of Foreign Training and Non-Training Programs CY 2018

Name of Participants	Title of Program	Date Conducted		Venue	Sponsor	Nature
		From	To			
Rio S. Pagtalunan	ASEAN-Japan Public and Private Collaborative Workshop) Sectoral Meeting in Thailand)	1/23/2018	1/24/2018	Thailand	Ministry of Economy, Trade and Industry of Japan	Meeting
Agustin M. Fudolig, Dr. Eng.	Study Visit to New Zealand Steel Facility, Glenbrook and Auckland University of Technology	02/28/2018	1/3/2018	New Zealand	PCIEERD-GIA project; New Zealand Steel Facility, Glenbrook; and Auckland University of Technology	Study Tour
Robert O. Dizon	Study Mission on Productivity Enhancement Through Applications of Industry 4.0 in Japan	6/3/2018	9/3/2018	Japan	Asian Productivity Organization (APO)	Study Mission
Rey N. Mariposque	3rd Country Study Tour of the Technical Working Group for the DTI-JICA Project for Elaboration of Industrial Promotions Plans Using Value Chain Analysis	8/4/2018	04/14/2018	India	Department of Trade and Industry-Board of Investments (DTI-BOI) and Japan International Cooperation Agency (JICA)	Study Tour
Florentino J. Lafuente Lemuel N. Apusaga Pablo Q. Acuin Melchor A. Gamilla	Visit of Inductotherm Group Australia Pty. Ltd facility and business discussion related to the procurement of an Induction Furnace System and Accessories	08/14/2018	08/17/2018	Australia	Velca Equipment and Engineered Products, Inc., and Inductotherm Group Australia Pty. Ltd.	Visit/Meeting
Ronie S. Alamon Raymond S. De Ocampo Jan Michael E. Saludes	Visit of Crane and Girder Welding/Manufacturing Facility of ABUS Kransysteme GmbH and Short Training on the Operation and Maintenance of an Electric Overhead Traveling Crane System	09/24/2018	09/28/2018	Germany	Velca Equipment and Engineered Products, Inc., and Inductotherm Group Australia Pty. Ltd.	Visit/Training
Rodnel O. Tamayo Joey G. Pangilinan Hazel Marie T. Murcilla Ariel R. Sernal	Training on the SU3500 Hitachi Electron Microscope	2/10/2018	4/10/2018	Japan	Sigmattech, Inc. and Hitachi High-Technologies Corp.	Training
Florentino J. Lafuente Romeo C. Bermudez Gabriel D. Galotia Joseph A. Romero	Factory Pre-Delivery Inspection/Buy-Off Activities for the "Supply of Labor and Materials for Furan Mizer System and Its Accessories"	3/10/2018	5/10/2018	Malaysia	Metserv Enterprise	Inspection/ Buy-Off Activities

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

List of Foreign Training...continued

Name of Participants	Title of Program	Date Conducted		Venue	Sponsor	Nature
		From	To			
Remartin S. Maglantay	Presentation of Paper titled Design and Finite Element Analysis of Customized Local Road Vehicles (CLRV): "The Case for the Tricycle and the Philippine Jeepney" at the Inst. Of Electrical and Electronics Engineer Region 10 Conference (IEEE TENCON) 2018	10/28/2018	10/31/2018	Republic of Korea	PCIEERD Human Resources Development Program (HRDP)	Paper Presentation
Joein L. Luces Allan John S. Limson Bobby F. Fronda Pascual N. Lumanta	Training on GE25A Gear Hobbing, ST25CNC Gear Shaping and FE30A Gear Shaving Machines under the project titled "Establishment of a Gear Making and Assembly Facility"	11/18/2018	11/23/2018	Japan	Mesco, Inc. and Mitsubishi Heavy Industries Machine Tool Co., Ltd	Training

Scholarship Programs CY 2018

I. Doctorate Degree Program

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

II. Master's Degree Program

Name of Scholar	Program/Course	Duration of Contract	School/ University	Type of Scholarship	Scholarship Status	Grantor
1 Asmado, Louren Joy G.	Master of Technology	Nov 2015 - Oct 2017	TUP Manila	Full Time / Local	On-going	DOST-HRDP
2 Bathan, Gharry M.	Master of Science in Mechanical Engineering	Nov 2014 - Oct 2018	TUP Manila	Part Time / Local	On-going	DOST-HRDP
3 Bautista, Mary Joy M.	Master of Science in Chemistry	1st Sem AY2016-2017 to 2nd Sem AY2019-2020	UST	Part Time / Local	On-going	DOST-HRDP
4 Bedis, Sheena S.	Master of Arts in Economics	Jun 2015 - Aug. 2017	PUP Manila	Full Time / Local	On-going	DOST-HRDP
5 Cabral, Maria Alicia B.	MPM/MPA (off-campus)	Contract in process	Ateneo de Manila University	Full Time / Local	On-going	DOST-HRDP
6 Ibañez, Christian M.	Master of Science in Electrical Engineering	1st Sem 2016-2017 to 1st Sem 2017-2018	TUP	Part Time / Local	On-going	DOST-HRDP
7 Luces, Joein L.	Master of Science in Mechanical Engineering	Jan 2016 - Dec 2020	Mapua Inst. Of Technology	Part Time / Local	On-going	DOST-HRDP
8 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
9 Rafanan, Marlene R.	Master in Business Administration	2nd Sem 2017-2018 to 1st Sem 2019-2020	San Beda Alabang	Full Time / Local	On-going	DOST-HRDP
10 Viernes, Mildred V.	Master of Information Technology	SY 2nd Sem/Nov 2010 - Mar 2013 (2.5 yrs)	UPLB	Full Time / Local (Residential)	On extension	ASTHRDP (DOST-SEI)

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

III. Graduated Scholar

Name of Scholar	Program/Course	Duration of Contract	School/ University	Type of Scholarship	Scholarship Status	Grantor
1 Nocheseda, Carla Joyce C.	Master in Material Science and Engineering	Sept 11, 2017-Sept 30, 2018	Univ. of Sheffield, UK	Full Time / Foreign	Graduation ceremony is in Jan. 2019	Chevenering Scholarship

B.3. We conducted the annual fire drill.

In compliance with the Environmental Management Plan, the DOST-MIRDC held its annual Fire Drill last April 5, 2018. Adjunct to this activity was the conduct of the Fire Fighting Training lead by FO3 Francis Dominic D. Cledera, and FO3 Am Jerico C. Benitez of the Taguig Fire Station - Bureau of Fire Protection through the assistance of Urduja Security Agency. Participants from the EMS Fire Bigade , PWS, MIAP, COA, Canteen Concessionaire, Janitorial and Security services attended the lecture and demonstration on fire fighting.



The MIRDC conducts its regular Annual Fire Drill together with the Taguig Fire Station - Bureau of Fire Protection

B.4. We joined in the annual earthquake drills.

With regard to the National Disaster Risk Reduction and Management Council’s (NDRRMC) mandate to promote regular disaster preparedness response and recovery exercises by conducting a Nationwide Simultaneous Earthquake Drill (NSED), the DOST-MIRDC enjoined its employees to participate in the public awareness activities twice during the year 2018. The first drill was held last February 15, 2018 while the second drill was held last November 18, 2018.

ery exercises by conducting a Nationwide Simultaneous Earthquake Drill (NSED), the DOST-MIRDC enjoined its employees to participate in the public awareness activities twice during the year 2018. The first drill was held last February 15, 2018 while the second drill was held last November 18, 2018.



MIRDC Employees with their duck, cover and hold training during the Semi-Annual Earthquake Drills

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

B.5. We actively promoted health and wellness.

Several programs and activities were conducted by the MIRDC as part of the welfare program for its personnel. One major program implemented is the whole-year #Go-forHealthier 2.0 wellness program which is in partnership with the DOST-FNRI. MIRDC employees from different divisions participated in the three-phase activities of this program which are the Baseline (held last May 31, 2018), Midline (held last September 19, 2018), and Endline Body Mass Index (BMI) Monitoring (held last November 26, 2018) at the Titanium Auditorium. Together with the said activities, a series of seminars and lectures regarding Stress Management, Occupational Safety, Ketogenic Diet and Intermittent Fasting, Health and Nutrition during Holidays were also conducted.

At the beginning of the year, with 69 participants who joined in the program, MIRDC had a percentage of 62% normal BMI, 29% overweight BMI, 6% obese BMI and 3% underweight BMI which is a simple index of weight-for-height that is commonly used as a general indicator of health. For the middle of the year assessment, with 28 participants consistently engaged in the program, MIRDC had a percentage of 54% normal BMI, 29% overweight BMI, 14% obese BMI and 4% underweight BMI. By the end of the year, MIRDC had an overall percentage of 61% normal BMI, 30% overweight BMI, 4% obese BMI and 4% underweight BMI from the 23 participants who still joined the year-end BMI assessment.

Why monitor your Body Mass Index (BMI)? According to TANITA Corporation 2011 study regarding body composition, body fat is essential for maintaining body temperature, cushioning joints, and protecting internal organs. However, too much fat increases the risk of having certain conditions such as high blood pressure, heart disease, type 2 diabetes, and certain cancers. On the other hand, too little body fat may lead to osteoporosis in later years, irregular peri-



Mr. Jason Paolo H. Labrador (top photo), Registered Nutritionist from FNRI gives seminar regarding Ketogenic Diet and Intermittent Fasting to participants from different divisions and have their midline weigh-in assessments and counseling.



"Your blood, His life", Employees from MIRDC actively participate in the bloodletting activity

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

ods in women, and possible infertility. Thus, everyone is encouraged to take conscious effort in maintaining and achieving the desired BMI for optimum wellness in health.

Another major highlight is the implementation of regular program for physical fitness activity in the Center. Weekly two-hour Zumba sessions resumed last August 3, 2018. Likewise, weekly one-hour exercise, sports or physical recreation of choice were also encouraged effective November 23, 2018 in accordance to the Civil Service Commission's (CSC) mandate to implement the Physical Fitness Program - Great Filipino Workout. The management makes sure that

MIRDC employees develop an active and healthy lifestyle in the workplace which in turn will help achieve overall organizational efficiency and success as every employee takes responsibility for his own health, given the privilege of these programs.

Moreover, as part of our social responsibility, a number of employees willingly shared their blood so that others may live. Employees took part in the bloodletting activity, in partnership with the Philippine Red Cross, dubbed "Your love, Your blood, His life 2.0" held last October 25, 2018 at the DOST-FNRI Training Room.



Pictures (clockwise top left): Engr. Robert O. Dizon with MIRDC Sportsfest participants; Engr. Pablo Q. Acuin with the winning muse from TDD, Viann P. Alarde; The lovely muses of every division; Engr. Edilbert M. Dela Peña, Ms. Salvacion "Cielo" V. Ruiles, Ms. Jocelyn R. Jerusalem and Engr. Rodnel O. Tamayo celebrate their success in running the long mile race; Employees in pairs run for a healthy cause.

B.6. We held the MIRDC Sportsfest.

In conformity with MIRDC's annual development plan to improve employee's health and promote meaningful recreational activities and welfare, a week-long Sportsfest Activity was held and started last April 17, 2018. Notwithstanding the heat of the sun, MIRDC employees and officials engaged in various sports, exercise program and marathon race from MIRDC to DOST Central Office and back to MIRDC as the finish line.

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

B.7. We had fun during MIRDC employee gatherings.

MIRDC Goes PG

As a component of MIRDC's Annual Learning and Development Plan (ALDP), FAD-AGSS once again planned and arranged the most awaited personnel welfare recreational activity themed "MIRDC Goes PG: Pagsasamang Ganap, Pasabog na Galak sa Puerto Galera...Pak Ganern!" that aims to promote better team skills and camaraderie for growth and improved performance as a whole workforce. For the first time, MIRDC employees together with some of their family members, traversed waters across Batangas to Puerto Galera to arrive at its destination, Tamaraw Beach Resort last May 17 to 18, 2018, making it one of the most memorable team building in the history of MIRDC.

Engrs. James Asher B. Cabarloc and Arvin Yan V. Pacia, with their merged witty and comical personalities facilitated

the series of activities that took place in the function hall of the resort. Likewise, the jovial and high-spirited Engr. Remartin "Magz" S. Maglantay and Ms. Deborah Jaynmerci D. Balota as well as the whole HR team, prepared and conducted challenging and at the same time, enjoyable games during the program.

The peak of the program was the rib-tickling competition of "Missed MIRDC" adapted from the "Miss Q and A" segment of ABS-CBN's noontime show. Participants from different divisions prepared their casual wear, evening gowns, catchy tag lines and chucklesome talent portions which added more fun to the excitingly hilarious event. It was a close fight for all the contestants. Apparently, it was Finance and Administrative Division's Engr. Reynaldo O. Bayot as "Maripussy" who captured the judges' interest and fascinated the audience during the question and answer portion that made him gain the victory of carrying the title "Missed MIRDC."

MORSELS OF MEMORIES from 2018 MIRDC Team Building

"A WHOLE NEW WORLD IN THE ISLAND OF PUERTO GALERA" – Where the sun smiles and the sea is whispering...A trip well-spent in the waters. These employees are definitely having a good time swimming with their friends and colleagues



The Future Begins Today

In celebration of MIRDC's 52nd year-mark, the Employees Day was conducted with the theme "The Future Begins Today...Let's Make It Happen" last June 22, 2018 through the initiative, creative minds, and organizational skills of the FAD-AGSS team headed by Dr. Jelly N. Ortiz. All employees were empowered with confidence as they took pride in exhibiting their futuristic costumes inspired by a desire to make today create a positive influence throughout the Center's growth in the coming years. To give highlight to the event, a Futuristic Dance Contest among divisions was held. TDD ranked first in the futuristic-inspired costume contest. Moreover, the joint cooperation and distinctive dance



Former DOST Secretary Mario G. Montejo gave his message to the beloved MIRDC personnel that impacted their perspective of the future of the metals industry

number of OED, PMD and TSS paved the way for them to win the futuristic presentation competition.

In MIRDC, We Make It Happen

Cheers for the bright future of MIRDC!!!



DOST-MIRDC officials and personnel showcase creativity and musical talent during the 52nd founding anniversary and employees' day celebration.

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

MAGICAL GLIMPSES OF 2018 MIRDC CHRISTMAS CARNIVAL**Cheery Christmas at the Carnival**

Feel the magic up close as gleaming and glittering balloons, feathers, various metallic and colorful decorations together with fun, excitement and love surrounded the MIRDC family during the most awaited and best time of the year.

Smiles on the faces of every child-like soul shone bright as MIRDC, headed by Finance and Administrative Division, held its year-end Thanksgiving Celebration of earnestness and dedicated commitment in excellent service along with the accomplishments of targeted goals for every division at the recently renovated and furnished Titanium Auditorium last December 20, 2018 with the theme “Christmas Carnival.”

For the season’s festival, engaged employees and guests were encouraged to prepare and wear circus-themed costumes utilizing the specific kind of material assigned for each division with a touch of their creative and artistic skills. Engr. Robert O. Dizon opened the occasion with an invitation to feel the joy of Christmas by sharing the blessings we receive. The director’s welcoming remarks heralded the spirit of giving as “Alay Sa May Mga Kapansanan Association Inc.” serenaded the crowd. Delightful and enjoyable games as well as special presentations magnified the fulfillment of this event’s theme of amusement and fun. ATD ranked first in the costume competition while Mr. Glenn R. Dioneda won first prize from the raffle draw.

The different divisions in their carnival’s best attire



SECTION 2: GENERAL ADMINISTRATION AND SUPPORT



(Left) ATD personnel in their unified and winning costume using recycled paper cups and plates with Jo Marie Venus T. Agad and Mary Emman Rose G. Solar in front who wowed the audience by their competitive and sophisticated regalia as carnival characters

12 Days of S&T Christmas

After all the blessings we have been receiving for the whole year, the best way to celebrate the Christmas season is through giving and sharing our time and resources to our neighbors. In celebration of this season, the Department of Science and Technology (DOST) orchestrated a DOST Year-End Sharing and Thanksgiving (S&T) Event with the theme “12 Days of S&T Christmas.” A series of Corporate Social Responsibility (CSR) activities culminated throughout the country, organized by different DOST agencies. The kick-off for this event was held last December 03, 2018.

As part of our corporate social responsibility and likewise, out of the genuine desire to serve and contribute to the educational phase in the lives of the children, MIRDC participated in the the said campaign last December 12, 2018. With the leadership of Ms. Aurea T. Motas and Engr. Eric C. Calanno, MIRDC donated three (3) wall-mounted electric fans to Daang Hari Elementary School received by Mr. Leonardo A. Eburnia, Jr., Principal III. Truly, as we give our conscientious efforts to provide in the educational lives of these future leaders, we are making the world a better place.



Ms. Aurea T. Motas together with Engr. Eric C. Calanno and Mr. Rouel G. Moreno participate in the DOST gift-giving which is part of the “12 Days of S&T Christmas” as they hand MIRDC’s contribution to Mr. Leonardo A. Eburnia Jr., Principal III of Daang Hari Elementary School.

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

B.8. We gave 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 52nd MIRDC Anniversary Employees' Day and the Thanksgiving Celebration. Below are the list of awardees for CY 2018:

52nd MIRDC ANNIVERSARY CELEBRATION Awardees

Title of Award	Name of Awardees	Division
LOYALTY AWARD		
Ten (10) Years	Nelson L. Tumibay (4/15/18)	MPRD
Fifteen (15) Years	Johnny G. Quingco (1/1/17)	FAD
	Ronaldo L. Agustin (5/16/18)	TDD
	Eric B. Casila (6/26/18)	PMD
Twenty Five (25) Years	Felix C. Banawa (1/18/18)	MPRD
Thirty (30) Years	Jocelyn F. Dime (3/23/18)	ATD
Forty (40) Years	Ruben L. Sepagan (1/24/18)	PD
	Evelyn L. Inventor (2/13/18)	PD
	Johnny U. Reyes (3/1/18)	PD
	Ramon M. Martin (5/2/18)	TDD
PERFORMANCE EXCELLENCE		
For Year 2017	Noli P. Alvior	PD
	Augusto S. Atanacio, Jr.	PD
	Ely C. Delos Reyes	PD
	Ramon M. Martin	PD
	Rosalinda M. Cruz	TDD
	Zalda R. Gayahan	TDD
	Marlyn U. Ramones	TDD
	Vilma A. Sia	TDD
	Teresita C. Viloso	TDD

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Anniversary Awardees Con't.

Title of Award	Name of Awardees	Division
2 Consecutive years (2016-2017)	Christian D. Brual	PD
	Virgilio H. Macanip, Sr.	PD
	Francisco M. Marasigan	PD
	Alma C. Dupagan	TDD
	Kristine A. Gealan	TDD
2 Consecutive years (2016-2017)	Jerameel C. Falcatan	ATD
5 Consecutive years (2013-2017)	Ronaldo L. Agustin	TDD
6 Consecutive years (2012-2017)	Reynaldo M. Loreto, Jr.	TDD
GRADUATE STUDIES		
BSEM-TEP	Linda G. Rivera	TDD
DIVISION MODEL EMPLOYEE		
Level I	Evelyn D. Inventor	FAD
	Serafin G. Aguilar	MPRD
	Ely C. Delos Reyes	PD
	Gil R. Roa	PMD
Level II	Maria Alicia B. Cabral	FAD
	Lemuel N. Apusaga	MPRD
	Joelin L. Lucas	PD
	Eric B. Casila	PMD
MIRDC MODEL EMPLOYEE		
Level I	Ely C. Delos Reyes	PD
Level II	Joelin L. Lucas	PD
BEST ORGANIZATIONAL UNIT	Management Information System	PMD

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

MIRDC Thanksgiving Celebration Awardees

Title of Award	Name of Awardees	Division
LOYALTY AWARD		
Ten (10) Years	Joey G. Pangilinan (11/03/18)	MPRD
Twenty Five (25) Years	Cornelio B. Young (10/18/18)	MPRD
	Florante A. Catalan (10/18/18)	ATD
	Aurea T. Motas (10/18/18)	FAD
	Salvacion V. Ruiles (10/18/18)	MPRD
	Ariel R. Sernal (11/16/18)	MPRD
	Jyrwen A. Ayao (11/16/18)	MPRD
	Gina A. Catalan (11/22/18)	ATD
	Raymond S. De Ocampo (12/17/18)	PD
	Marlene R. Rafanan (12/16/18)	FAD
Thirty (30) Years	Norma B. Garcia (8/01/18)	FAD
Thirty Five (35) Years	Galicano M. Enerlan (07/06/18)	FAD
	Tirso P. Entereso (07/18/18)	PD
	Celso L. Aguisanda (08/01/18)	MPRD
Forty (40) Years	Rolando Y. Clavio (08/17/18)	FAD
	Vilma A. Sia (12/01/18)	TDD
GRADUATE STUDIES		
Bachelor of Science in Mechanical Engineering	Rouel G. Moreno	FAD
Master of Science in Materials Science and Engineering	Carla Joyce C. Nocheseda	MPRD
CORE VALUES		
Professionalism	Jonifer Rose D. Bernaldez	FAD
Responsiveness	Trinmar A. Boado	PMD
Integrity	Luisito N. Alcantara	ATD
Dynamism	Zalda R. Gayahan	TDD
Excellence	Marcela R. Cagalingan	FAD

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

B.9. We carried out effective management of our financial resources.

Accountability is considered a bedrock for a strong economy. Public programs are accountable for accurate and appropriate information.

The year 2018 is another year for the DOST-MIRDC as the agency continues its journey and commitment towards the realization of its mission and vision embodied in its Strategic Plan 2015-2025 in conformance with the national agenda. Through the years, the Center has undergone a series of transformations to improve public accountability, manage results and transparency. Simultaneous with the implementation of Program Expenditure Classification (PREXC) by the Department of Budget and Management (DBM), the Center has identified its indicators to strengthen programs it will implement. With the adoption of PREXC, the Center establishes a regime of greater accountability on how each peso spent on a program delivers measurable results. This of course is envisioned through the Center's vision to be the center of excellence in science, technology and innovation for a globally-competitive metal, engineering and allied industries by 2025.

The Center successfully continued to deliver its mandated programs and projects by efficiently and effectively utilizing its limited resources, establishing good partnership with the industry and other government agencies, and by developing competent manpower. Together with its collaborators, the Center has persevered in funding and implementing several R&D projects and banner programs such as mass transportation which have undergone testing and re-financing to come up with commercial-ready models.

As the premier in metals research and development, the Center makes itself ready to support the programs and thrusts of the administration, especially in disruptive technologies particularly on additive manufacturing.

The Center strongly observes due diligence and utmost responsibility in utilizing its financial resources. Below are the financial information relevant to MIRDC 2018 fiscal operations.

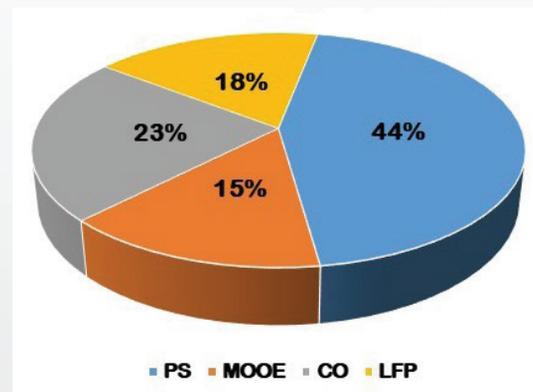
Regular Fund: Source and Utilization

In 2018, the biggest chunk of the Center's budget was directed towards research, promotion and development of science and technology under its banner programs which gained prominence due to its unique characteristics.

Allotment and Obligation

The Center has a total approved budget of P 369,800,679.00 for the current year's appropriation. Under the current appropriation, 45% or P 165,281,707.00 (inclusive of RLIP) was allotted for Personnel Services (PS), 12% or P 54,353,972.00 for Maintenance and Other Operating Expenses (MOOE), 1% or P 84,725,000.00 for Capital Outlay (CO) and 42% or P 65,440,000.00 for Locally Funded Projects (LFP) as shown below:

2018 Current Appropriation

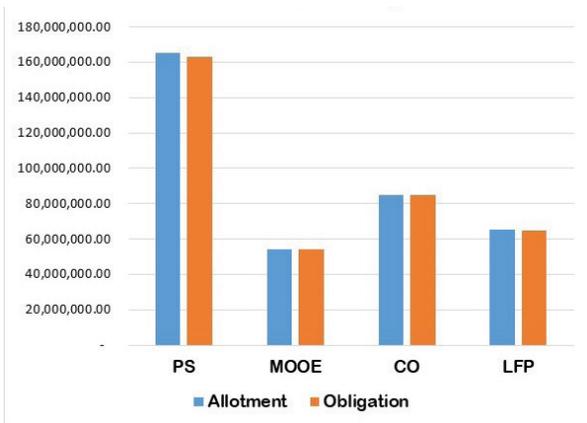


Source: MIRDC-FMS Budget Unit

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Of the total allotment received, the Center obligated P 366,975,372.92 or posted 99% efficiency budget utilization rating for the year 2018 as detailed:

Allotment Received vs Actual Obligation

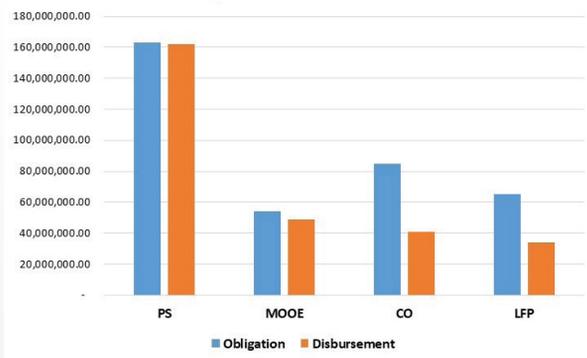


Source: MIRDC-FMS Budget Unit

Obligation and Disbursement

Financial performance in terms of Obligation and Disbursement shows 78% as detailed below:

Obligation vs Disbursement

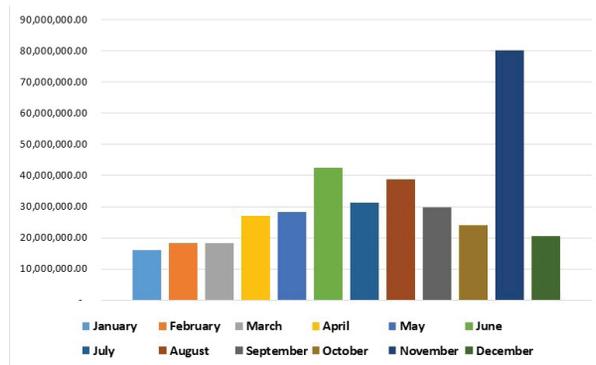


Source: MIRDC-FMS Budget Unit and Accounting Unit

Cash Allocation and Utilization

The total amount of cash released by the Department of Budget Management (DBM) for the year 2018 was P 374,378,136.00 to the Center’s Regular MDS Account which include payment of current accounts payable which was released in November 2018 as detailed:

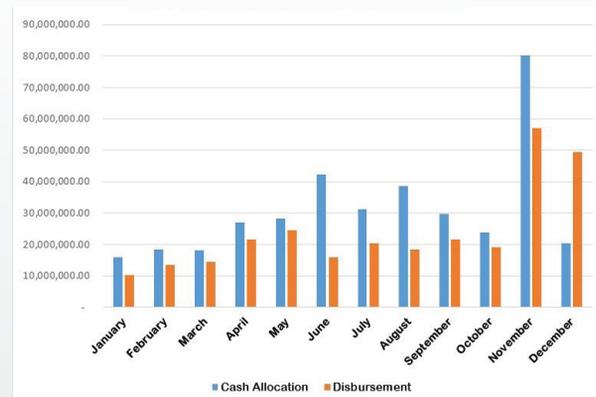
2018 Cash Allotment Received



Source: MIRDC-FMS Accounting Unit

Of the total cash allotment received for Regular Fund for the year 2018, P286,223,488.27 were disbursed posting a 76% utilization rate as exhibited:

2018 Cash Allocation vs Disbursement (Regular Fund)



Source: MIRDC-FMS Accounting Unit

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Trust Receipts: Source and Utilization

MIRDC initiated and undergone collaborative projects with other agencies that respond to domestic needs and provide support to other industries. The Center received a total amount of P 72,833,904.95 under Trust Receipts from its partner-agencies as

tabled below. 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.

Schedule of Fund Transfers from Funding Agencies & Contracting Entities in 2018

Funding Agency	PROGRAMS & PROJECTS WITH BALANCES CARRIED IN 2018	Amount
DOST 7	"Technology Promotion and Field Testing of the Hybrid Electric Road Train in Cebu City"	72,113.23
DOST	"Technology Promotion of Road Train in Metro Manila and Pampanga"	532.05
PCAARRD	"Piloting of Hand Tractor-Attached Harvester and Hand-Tractor Attached Transplanter in Selected Rice Growing Regions"	269,269.79
PCAARRD	"Design and Development of Sugarcane Harvesting Equipment for Small Sugarcane Farms"	532,130.91
PCAARRD	"Development of a Fluidized Bed Dryer for Production of Stabilized Brown Rice (SBR)"	22,971.82
DOST	"Human Resource Intervention for Sustainable Growth and Competitiveness of the M&E Sector: Development and Implementation of Appropriate Training Curriculum Design for CNC Machine Tool Programming"	9,060.67
PCIEERD	"Design and Optimization of Austenitic Manganese Steel Liners for Phil. Aggregates and Mineral Processing"	1,104,922.01
DFA	"Prototyping and Pilot Production of Eyelet Riveter/Machine"	74,262.13
CLSU	"Design and Dev't. of Forage-Blades and Chopper for Goat Production"	2,174.38
PCIEERD	"Development of Prototype Trainset"	570,476.62
PCAARRD	"Design and Dev't of Superheated Steam Treatment System for Stabilized Brown Rice"	362,272.77
DOST	"Establishment o a Gear Making and Assembly Facility"	6,557,011.80
DOST	"Setting-up of One-Stop Laboratory Services for Global Competitiveness (OneLab)"	58,305.93
DOST	"Roll-out of DOST-Developed Food Processing Equipment to the Regions"	7,457,307.52
DOST	"Development of 12HP Single Cylinder Diesel Engine"	464,352.96
DOST	"Study on the Viability of Deploying DOST-developed Mass Transportation Technologies in Baguio City and La Trinidad"	4,295.95
DOST	Strengthening the Project Management and Engineering Design Services at DOST"	3,111.46
DOST	NSTW 2017 (DOST)	5,300.83
TAPI	NSTW 2017 (TAPI)	1,088.33
DOST	"Strengthening S&T Capabilities Through Competency-Based Human Resource Management for Department of Science and Technology"	38,101.31
DTI	"Supporting Philippine Companies in the Preparation and Implementation of an Aerospace Quality Management System (AQMS) Aligned with AS9100 Requirements"	6,493,919.82
PCIEERD	"Design and Fabrication of Equipment for the Production of Local Cocoa Products"	183,309.03
DOST	"Design and Development of Process Equipment for Food Processing Firms"	859,390.75
DOST	"Capacity Building for Competitiveness of the Metals and Engineering Industry Cluster (CAIMTEC) of CAR"	115,870.62
Anaki Systems Sales	"Design and Development of Techymetry Module Casing Mold Sets and Rapid Phototyping of Chopper Control Electronic Rack for the Localization of LRT 1 Maintenance Parts and Components"	20,044.07
DOST	"Training/Workshop on Scientific Writing for DOST Researcher"	5,856.68
DOST	"Leveraging R&D Human Resource through HR Analytic"	139,900.00
DTI	"Development of Ceramics Equipment"	1,850,540.00
PCAARRD	"Pre-Commercialization Services of Rice Transplanter Attachment (RTA) and Rice Harvester Attachment (RHA) for Hand Tractor"	2,778,354.63
PCIEERD	"Modification of Road Train Energy Storage Using Lithium Ion Batteries"	3,067,013.27
DOST	"Enhancing OneLab for Global Competitiveness - RDIs Components-MIRDC"	307,464.23

SECTION 2: GENERAL ADMINISTRATION AND SUPPORT

Schedule of Fund Transfers...continued

Funding Agency	PROGRAMS & PROJECTS WITH BALANCES CARRIED IN 2018	Amount
DOST-NCR	"Establishment of Complementary Baby Food Plant"	186,087.16
Care Phils.	"Design Modification of Tikog Flattening Machine"	2,129.40
DTI-BOI	"Technical Economic Feasibility Study to Determine the Most Suitable Ironmaking Technology for Value Adding of Phil. Magnetite Resources" DTI-BOI	2,809,425.58
PCIEERD	"Technical Economic Feasibility Study to Determine the Most Suitable Ironmaking Technology for Value Adding of Phil. Magnetite Resources" PCIEERD	269,923.37
	Subtotal	36,698,335.08
NEW PROGRAMS & PROJECTS WITH FUND TRANSFERS IN 2018		
BOI	"Capability Building for Enhancing the Competitiveness of Die and Mold Industry through the Engagement of Foreign Expert (DiMo GURU Project)"	2,000,000.00
	"Improvement of Gong Fabrication Process through S&T Intervention at Mankayan, Benguet"	3,166,316.00
	"Design and Development of Equipment for Biomass Waste Management System"	92,169.00
	"Development of Automatic Trash Rake for Malabon"	5,000,000.00
TAPI	MIRDC Participation to the Celebration of NSTW 2018 (TAPI)	200,000.00
DOST	"Organization Development: Enhanced Readiness for Tomorrow's Challenges"	648,000.00
DOST	Implementation of Committee on Physical and ICT Logistics Activities for the CY 2018 NSTW	1,619,500.00
DOST	"Enhancing OneLab for Global Competitiveness - RDIs Components-MIRDC" Y2	2,479,784.87
DOST	"Strengthening the DOST Regional Metrology Laboratory Services - Phase II"	4,254,991.00
DOST	"MIRDC Participation to the Celebration of 2018 National Science and Technology Week - NSTW"	917,800.00
DOST	"AGT-UP End of Project"	15,670,000.00
	"Waste Disposal Machine"	87,009.00
	Subtotal	36,135,569.87
	TOTAL	72,833,904.95

Source: MIRDC-FMS Accounting Unit

The total amount released by the DBM was P 77,446,187.00 to cover trust receipts for the expenditures of programs and projects to be undertaken by the Center which is inclusive of various refunds made by customers, performance bond and refunds of various projects.

Of this amount, the Center disbursed P 49,012,284.94 or 63% of the total cash allocation for the year 2018.

Revenue Generated

MIRDC served 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 provided specialized trainings 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 has able to generate revenues from the different services it provided and out of business incidental to its operations. These revenues were subsequently deposited to the National Treasury.

The total amount collected from various sources of revenue during the year was P29,075,263.30 as detailed:

Distribution of Revenue Generated from Operation

Description	Amount
Fines and Penalties	816,008.21
Other Service Income	23,580,343.60
Seminar / Training Fees	4,474,090.00
Interest Income	1,470.88
Rent / Lease Income	185,870.61
Other Business Income	17,480.00
TOTAL INCOME	29,075,263.30

Source: MIRDC-FAD accounting Unit

These revenues include constructive income generated out of fines and penalties imposed against agency's suppliers.

SECTION 3: INFRASTRUCTURE

A. ICT-Capability Upgrading

For CY 2018, the Center continued to secure funding from the government-wide Medium-Term Information and Communications Technology Harmonization Initiative (MITHI) Program of the Department of Information and Communications Technology (DICT) and the Department of Budget Management (DBM).

Of the Php 9.3-Million granted by the DBM, Php 4.4 Million portion is allotted to the ICT project, entitled, 'Establishment and Strengthening of Information and Communication Technology Infrastructure (ICT INFRA) and Business Online Solution System (BOSS) of the Center in Support to the Productivity and Competitiveness of the M&E Industries.'

The ICT INFRA/BOSS project is a continuing project implemented by the PMD

MIS with the aim of establishing ICT infrastructure and online information systems that provide fast, secured, and efficient government services for the M&E industries, clients, and the general public. For 2018, the ICT INFRA/BOSS project activities focused on (1) acquisition of ICT machinery and equipment to further expand the Local Area Network (LAN) and enhance network security and upgrade of the data center, as well as (2) ICT trainings.

In line with these priorities, we successfully carried out the following:

- We upgraded desktop and other ICT hardware and software requirements such as wireless access points, biometrics, high-speed scanner, printers and software licenses on graphic design, computer-aided design and MS Office licenses;



HACK4PH: The 1st Philippine e-Government Innovation Challenge held on November 23, 2018. First row and first from the left is Trinmar Boado, Computer Programmer III (above); Training on system development, integration and system interoperability for the DOST Region XI – Davao where Trinmar Boado served as Resource Speaker (left).



Management Information Service, Best Organizational Unit of 2017.

- We continued to work on the installation of temporary LAN and fiber optic cables to ensure continuous network services and minimal work downtime especially that there is ongoing renovation of different offices within the Center and some DOST offices are temporarily relocated in the MIRDC Compound. We completed three (3) network upgrades within the first semester (January-June 2018) of CY 2018.
- We completed additional systems enhancement/development
 - o Integration of the Annual Procurement Plan and Project Procurement Management Plan (PPMP) with the Purchase and Property Management System (PPMS);
 - o Online tracking of the status of Technical Service Requests (TSR) thru the Customer Portal of the Unified Laboratory Information Management Systems (ULIMS);
 - o Enhanced Job Order Information System or OneShop for monitoring of jobs from the shops; and



Mr. Eric B. Casila (upper photo) is awarded Division Model Employee Level II and Mr. Gil R. Roa (lower photo) is awarded Division Model Employee Level I. Certificate is awarded by Deputy Executive Director for Research and Development, Engr. Jonathan Q. Puerto, Executive Director Robert O. Dizon, and Deputy Executive Director for Technical Services, Dr. Agustin M. Fudolig during the Employees Day celebration on June 22, 2018.



Students, faculty, and administrators of the Taguig City University (TCU) welcome Team MIRDC for the conduct of the Campus Talk at the TCU on February 23, 2018 as part of the celebration of the Philippine Innovation Week (left); Guests actively participate in the FGD on the Design and Optimization of Austenitic Manganese Steel Liners for Philippine Aggregates and Mineral Processing held on May 29, 2018 (center); and Company owners and major players provide insightful inputs during the FGD for the 2018 Industry Study of the Metalworking Sector focusing on the Machining, Die and Mold, and Forging Industries held in December 2018 (right).

- o Compliance of the Project Monitoring Information System (PMIS) with the reportorial requirements of the DOST-Central Office.

Further, the Center has started its Information Security Management System (ISMS) journey thru the conduct of various ICT seminars/trainings/workshop such as: ISO 27001 Awareness, ISO 27001 Risk Assessment and ISO 27001 Risk Treatment. In relation to the ISMS initiatives, the Center's MIS personnel participated in a Cyber Security workshop in Naga City last 22-24 November 2018 to gain knowledge on various network security issues/concerns and the best practices of other organizations on cyber security. Likewise, an in-house training on advanced source code programming was organized to prepare programmers in developing advanced and secure application systems.

One of the Center's pride, Mr. Trinmar Boado, Computer Programmer III, bagged the grand prize on the Hack to Learn Category with his team. This was during the HACK4PH: The 1st Philippine e-Government Innovation Challenge whose aim is to co-create innovative and citizen-centered solutions of the future. Mr. Boado was also tapped to share his expertise and best practice experiences in system development, integration and system interoperability as Resource Person / Trainor of DOST Region XI – Davao last December 17-19.

In recognition of our MIS personnel's exemplary performance in their fields, Eric B. Casila, Unit Head of the MIS, was awarded as the Division's Model Employee Level II, while Gil R. Roa was awarded the Division Model Employee for the Level I category during the Employees Day Celebration held June 22, 2018. Trinmar A. Boado was named the MIRDC Core Value Awardee for Responsiveness during the MIRDC Thanksgiving Day held on 20 December 2018 at the Titanium Auditorium. Moreover, the MIS Unit was awarded as the Best Organizational Unit for 2018.

B. Other MIRDC Infrastructure Programs

B.1. We upgraded the MIRDC Laboratory and Administrative Building.

We aim to extend the useful life of the ATD building and ensure long-term safety and reliability, and to improve seismic resistance required for modern buildings. Infrastructure works include complete retrofitting, rehabilitation and renovation/upgrading of offices, laboratories, conference rooms, auditoriums and comfort rooms, including lobby, hallways and landing areas of the ATD Building; construction and installation of elevator unit; rehabilitation of low voltage switch gear (LVSG),



(L) Chapel in the second floor; (R) hallway along the ground floor of the Gold Building.

including provisions for electrical and mechanical works.

Below are the completed projects under this program:

1. Construction of an 8-Person (630 kg) Capacity Elevator System for the Gold Building
2. Construction, Rehabilitation and Restoration of Comfort Rooms at Basement, 1st, 2nd and 3rd Floors of Gold Building.
3. Renovation of Gold building offices, laboratories, auditorium, and chapel.

B.2. We constructed the MIRDC access road, and repaired the perimeter fence.

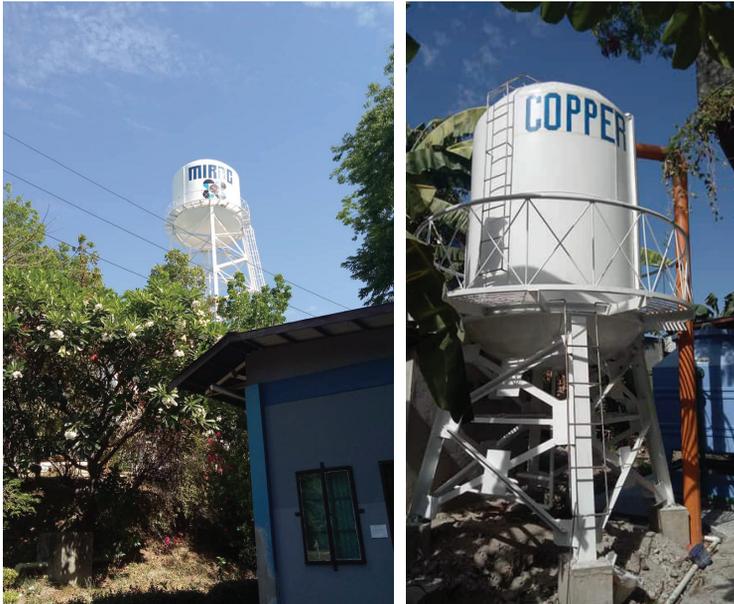
The existing perimeter fence with deteriorated steel fences and collapsing concrete walls was repaired. Priority was given to areas that needed proper retaining walls and firewalls to strengthen security measures and deter intruders coming in from surrounding illegal settlers around the MIRDC property. We installed electrical



Top) DOST South Gate; (Bottom) MIRDC covered walkway.



DOST South Gate Tower



(L) Elevated tank; (R) Rain catchment tank.

components for lamp posts to improve visibility around the MIRDC Compound at night. We also painted the steel wire mesh to prevent rusting, and painted concrete walls to slow down deterioration caused by various weather elements.

We likewise completed the following projects under this program:

1. Repair and Asphaltting of Selected Roads at MIRDC Compound.
2. Construction of a DOST South Signage, a Covered Walkway along MIRDC Main Road, 6 Slot Covered Motor Vehicle Parking Lot, Covered Motorcycle and Bicycle Parking Lot and Construction of an 11 Slot Covered Motor Vehicle Parking Lot near Gold Building.
3. Construction of Watch Tower, Retaining Wall, Gazebo and Guard Outpost Leading to PTRI.

B.3. We constructed a new cistern tank and upgraded the Center's water supply.

We want to meet the increasing demand for water supply, extend the useful life of the Center's overhead tank, rehabilitate the old water and sanitary lines, and install fire hydrants in each building in compliance with the Bureau of Fire Protection (BFP) requirements.

The new cistern tank will serve as an additional reservoir so that the Center's demand for water will be met. We conducted integrity check-up and rehabilitation. Further, rain catchment tanks were installed as additional source of water supply. Due to wear and tear conditions of water and sanitary lines, replacement and rehabilitation is recommended. Fire hydrants in each building will be installed.

Completed projects under this program are the following:

1. Construction of New 40,000 gal. elevated tank for MIRDC; and
2. Rehabilitation of the Center's Piping System, Construction of a New Cistern Tank and Rain Catchment Tanks.

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Executive Director, MIRDC



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Deputy Executive Director for Technical Services



Engr. Jonathan Q. Puerto
Deputy Executive Director for Research and Development



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Chief, Technology Diffusion Division



Dr. Rio S. Pagtalunan
Chief, Analysis and Testing 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. Fred P. Liza
Chief, Prototyping Division



Engr. Rodnel O. Tamayo
Chief, Materials and Process Research Division

MIRDC ORGANIZATIONAL STRUCTURE



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Executive Director



TRIXIE HAZEL C. VELUZ
Attorney IV
Office of the Executive Director (OED)



EDILBERT M. DELA PEÑA
Head, Technical Solutions Services (TSS)



JONATHAN Q. PUERTO
Deputy Executive Director for Research & Development



AGUSTIN M. FUDOLIG
Deputy Executive Director for Technical Services



FRED P. LIZA
Chief, Prototyping Division (PD)



RODNEL O. TAMAYO
Chief, Materials and Process Research Division (MPRD)



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Chief, Planning and Management Division (PMD)



DANILO N. PILAR
Chief, Technology Diffusion Division (TDD)



RIO S. PAGTALUNAN
Chief, Analysis & Testing Division (ATD)



AUREA T. MOTAS
Chief, Finance and Administrative Division (FAD)



FRANCISCO C. DIME
Chief, Design Section (DS)



MARIA GRACIA M. PERALTA
Chief, Materials Research Section (MRS)
January - June 21, 2018



RESTITUTO R. GABUYA
Supervising Planning Officer, Planning and Management Division (PMD)



REYNALDO L. DE LA CRUZ, JR.
Chief, Industrial Training Section (ITS)



FLORANTE A. CATALAN
Chief, Physical Laboratories Section (PLS)



JOHNNY G. QUINGCO
Chief, Financial Management Section (FMS)



JOSE B. FERRER
Chief, Product Development Section (PDS)



JOEY G. PANGILINAN
OIC, Materials Research Section (MRS)
June 28, 2018 - Present



LINA B. AFABLE
Chief, Technology Information and Promotion Section (TIPS)



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Chief, Chemical Laboratories Section (CLS)



JELLY N. ORTIZ
Chief, Administrative and General Services Section (AGSS)



ISIDRO D. MILLO
Chief, Equipment Prototyping Section (EPS)



FLORENTINO J. LAFUENTE
Chief, Process Research Section (PRS)



MA. GIRLIE M. MILLO
Chief, Technology Advisory and Business Devt. Section (TABDS)



ROMMEL N. CORONA
Chief, Instrumentation and Metrology Section (IMS)

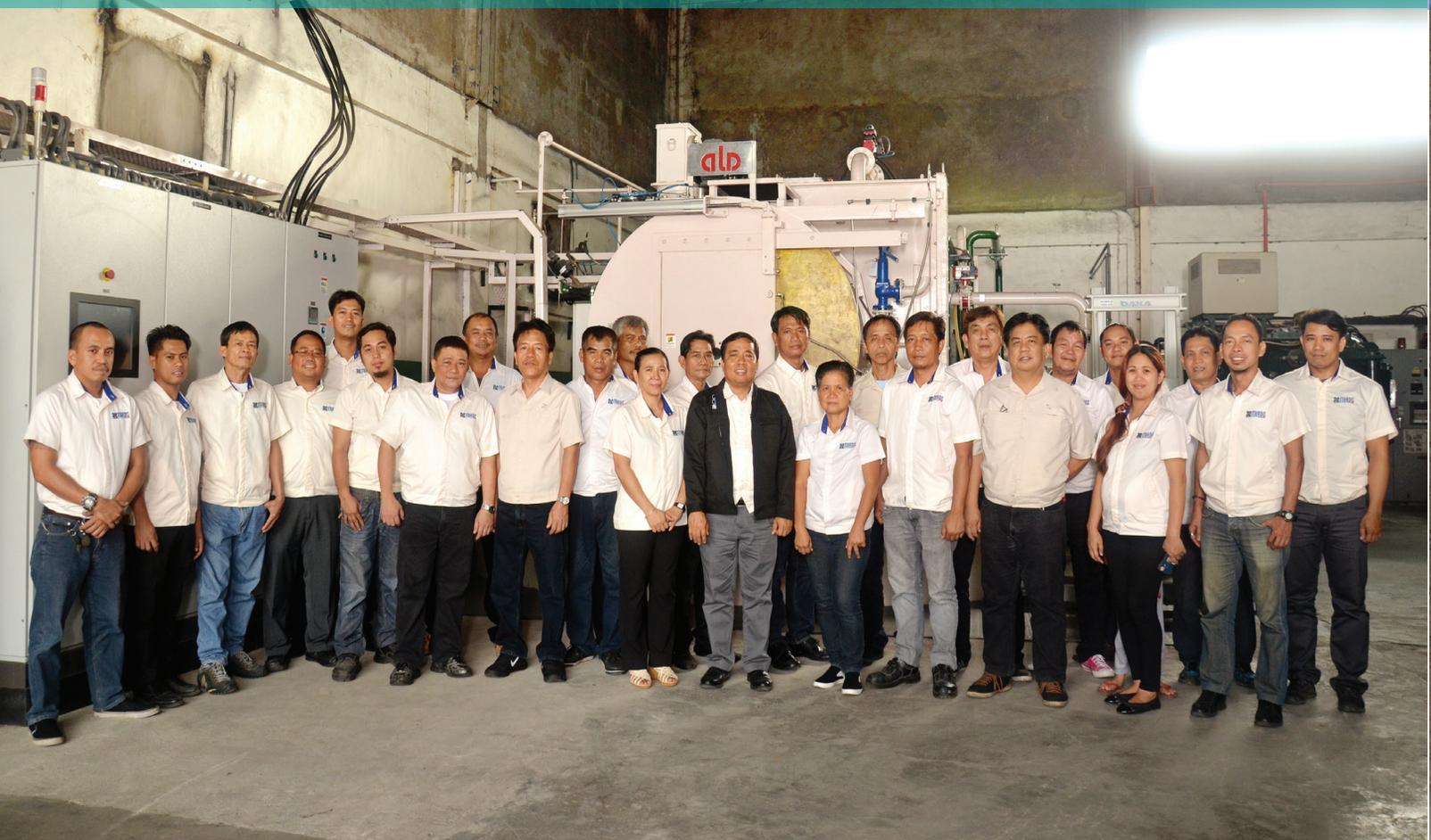
Office Of The Executive Director



Prototyping Division



Materials & Process Research Division



Analysis & Testing Division



Technology Diffusion Division



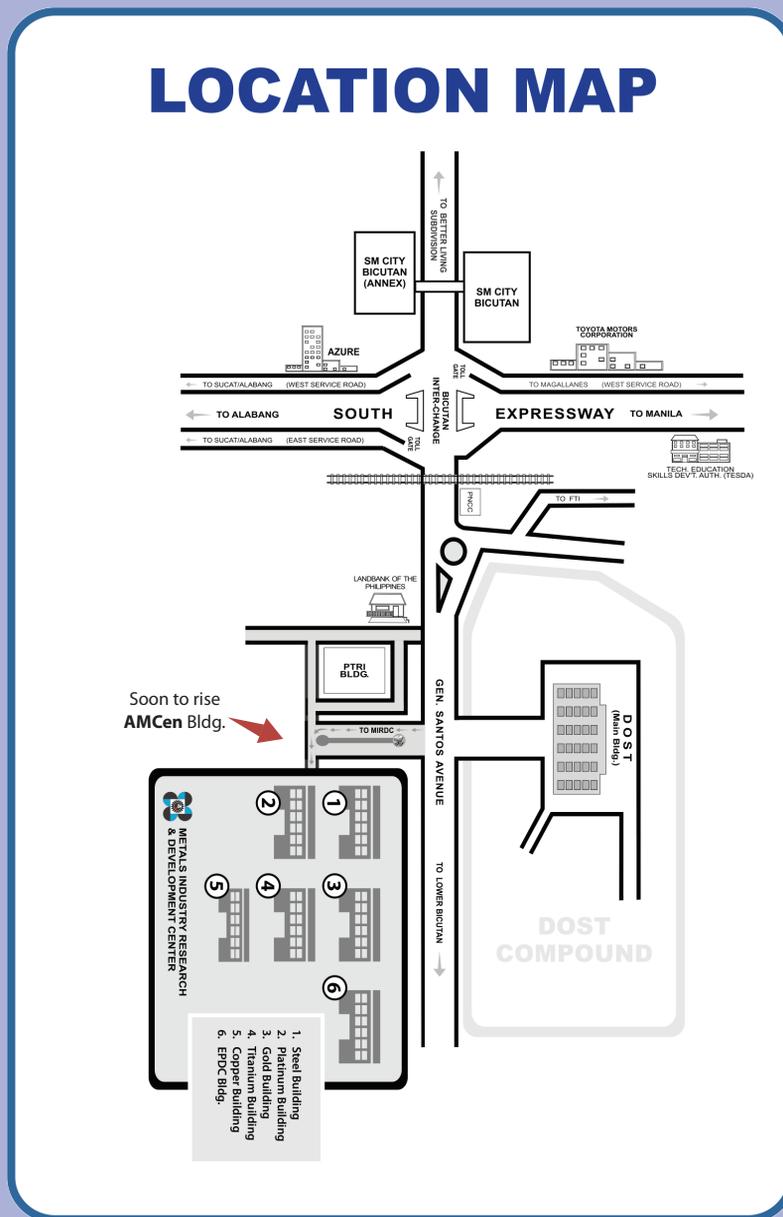
Planning & Management Division



Finance & Administrative Division



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 mabubuhay
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

Editorial Board

From left: Ronald L. Agustin, Linda G. Rivera, Alma C. Dupagan, Anthony Greg F. Alonzo, Zalda R. Gayahan, Lina B. Afable, Danilo N. Pilar (*Editor-in-Chief*), Fred P. Liza, Arvin Yan V. Pacia, Deborah Jaymerci D. Balota, Ivy Marie P. Espinosa, Marilyn U. Ramones, Carla Joyce C. Nocheseda





**DEPARTMENT OF SCIENCE AND TECHNOLOGY
METALS INDUSTRY RESEARCH AND DEVELOPMENT CENTER**

MIRDC Compound, Gen. Santos Avenue
Bicutan, Taguig City, 1631 Metro Manila
P.O. Box 2449 Makati, 1229 Metro Manila, Philippines
Telephone Nos.: (632) 837-0431 to 38 (connecting all departments)
Fax Nos.: (632) 837-0613 and 837-0430
Website: <http://www.mirdc.dost.gov.ph>
E-mail: mirdc@mirdc.dost.gov.ph