



Boating Industries Association of the Philippines

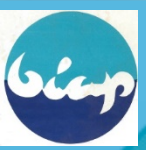
**“INITIATIVES, INNOVATIONS and
INVESTMENTS IN BOATBUILDING”**

2020 NATIONAL MARITIME WEEK

MARINA MANILA

SEPTEMBER 24, 2020

ENGR. EUGENE T. SUPANGAN



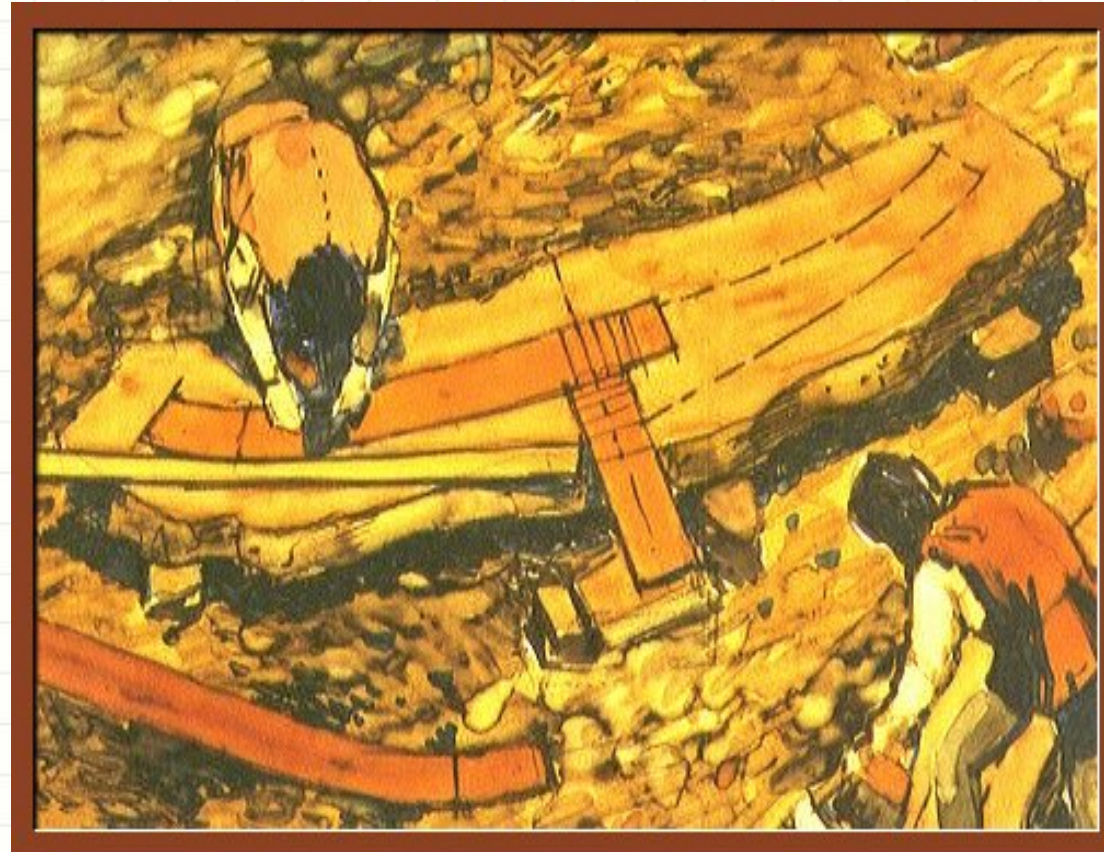
INITIATIVES in Boat Building :

A look at basic boat construction, fiberglass technology, and the fundamentals that modern boat builders use.

- The first revolution in modern boat building was the shift from mostly wood to fiberglass construction.
- Fiberglass boat construction is when the major components of the boat—the hull, deck, liner, and large parts like consoles—are molded from fiberglass.
- Resin and cores make up a large part of the construction.
- Advanced boat building techniques include vacuum bagging and vacuum infusion, where minimizing weight while maximizing strength is virtually always the goal.

Boat Building : Early Ship Building Techniques

Ancient ship builders used three patterns to cut shapes from wood. This was called moulding or mould lofting.

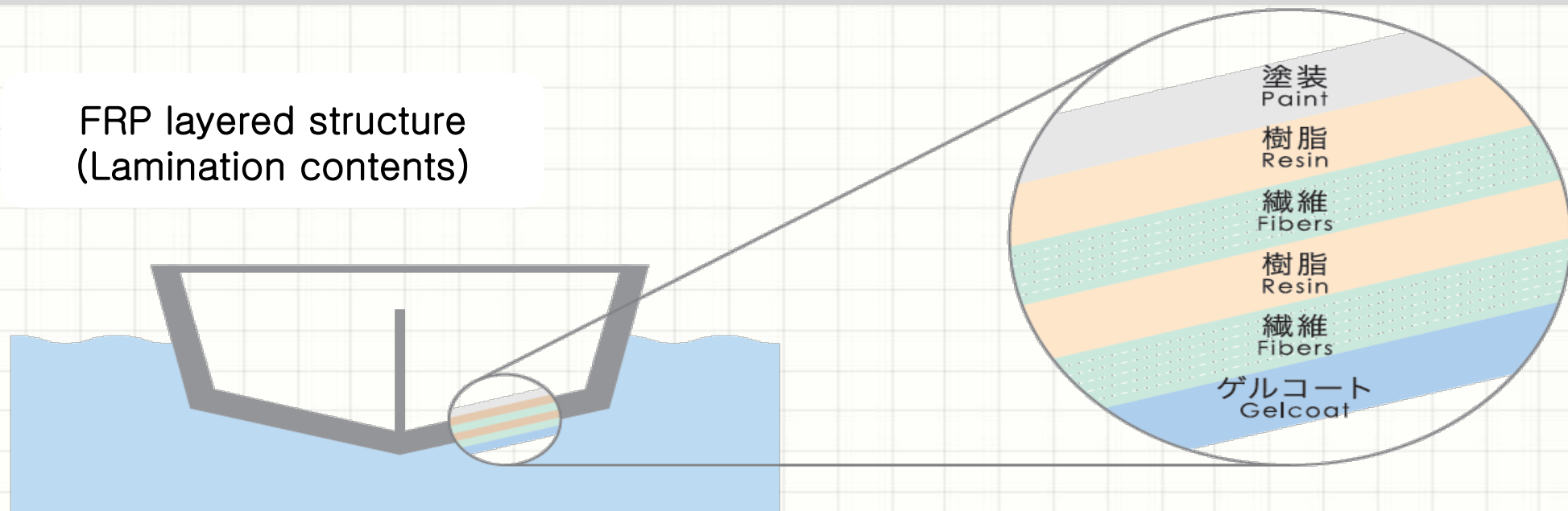




What kind of material is FRP?

FRP stands for Fiberglass Reinforced Plastic and is main material used in the construction of FRP boats. Plastic (synthetic resins) is made primarily from petroleum and is a light material with many advantages. But, plastic also has a weak point in that it is easy to bend and is not very strong. However, when stiff, strong glass fiber, etc. is mixed into the plastic and several layers are hardened together, it becomes a light but strong “reinforced” composite material, or FRP.

FRP layered structure
(Lamination contents)





BOAT BUILDING: RESIN

TYPES OF FIBERGLASS RESIN:

- **Polyester**
- **Vinylester**
- **Epoxy**

Each has a place in the boat-building world. The important factor is for the builder to correctly match the resin to the type of reinforcing material being used so that the strengths are matched.

INNOVATIONS: Making a boat by the hand lay-up method

APPLYING RELEASE WAX TO THE MOULD



SPRAYING OF GELKOTE WHITE



INNOVATIONS : Making a boat by the hand lay-up method



Using Rubber Spatula



Proper use of Rollers



Be careful on the corner side



INNOVATIONS : USING MVP Chopper Gun



INNOVATIONS: Setting of RFM and Foam Core into Hull

Setting up of PLW at Bumper



Setting of Foam Core

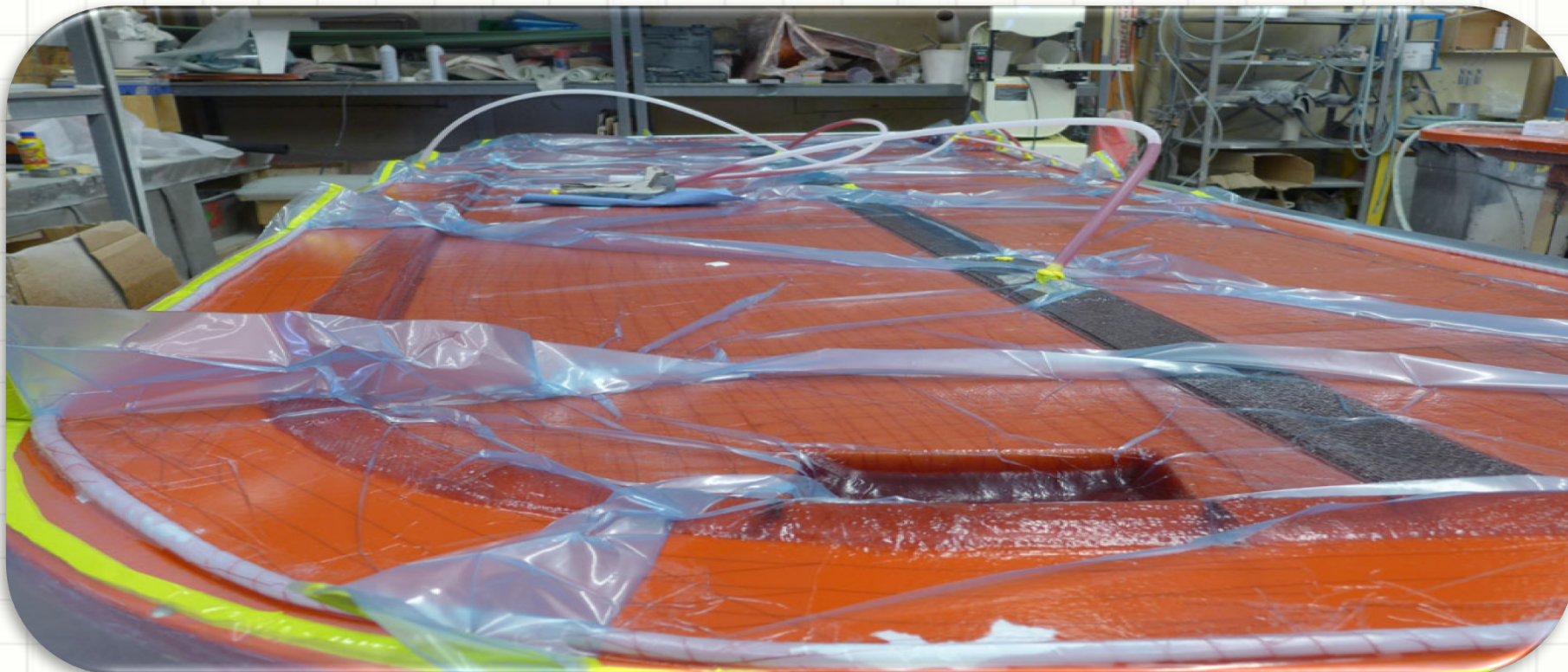


Using a Chopper Gun with Resin to the RFM



INNOVATIONS: ADVANCED CORE MATERIALS

Core materials are often used to reduce weight and increase stiffness. Some builders core the entire boat; others construct with solid fiberglass from the waterline down and coring above; and still others use some mix of coring and solid glass throughout the boat.



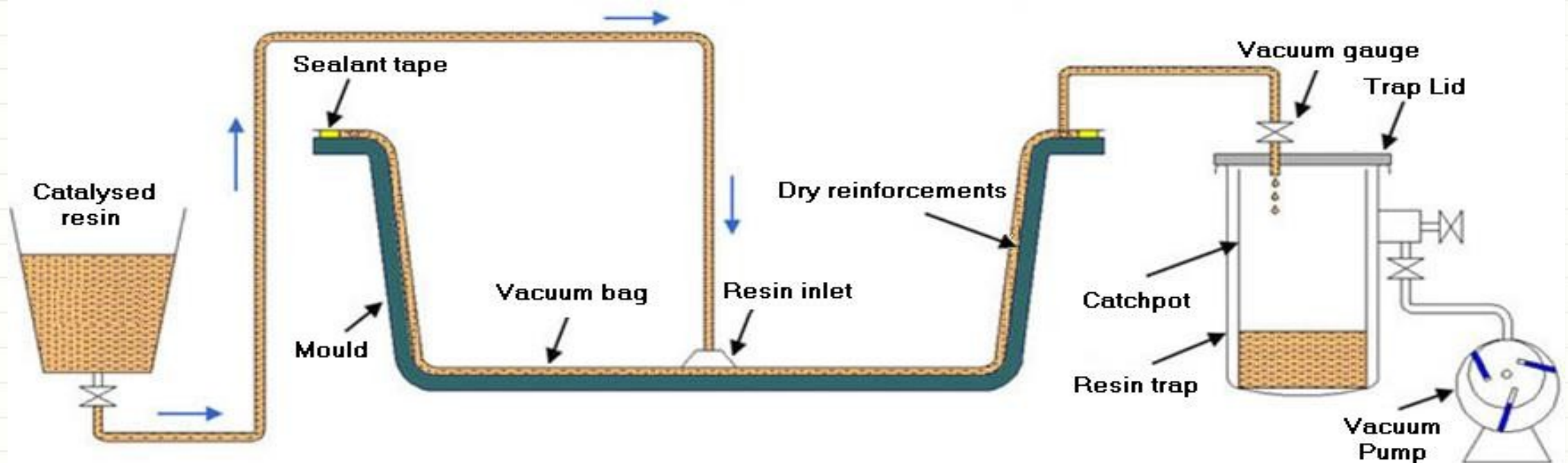


INNOVATIONS : Vacuum Infusion

- Principles
 - One part rigid mould (commonly a hand lay-up FRP mould)
 - Bag / Film material is used as a second half
 - Gelcoat and reinforcements placed into the mould
 - Bag / Film material placed over the top and sealed around the mould edge.
 - Catalysed resin pulled into the cavity by vacuum
 - Resin flows in the plane of the fabric between the mould and the bag

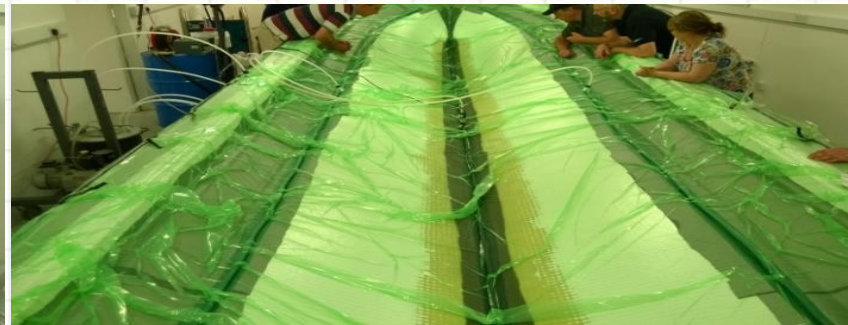
INNOVATIONS : Vacuum Infusion

- Infusion set-up schematic



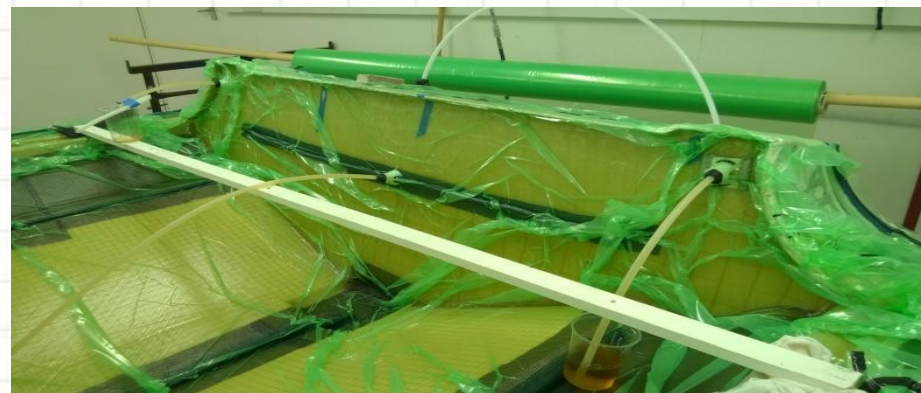
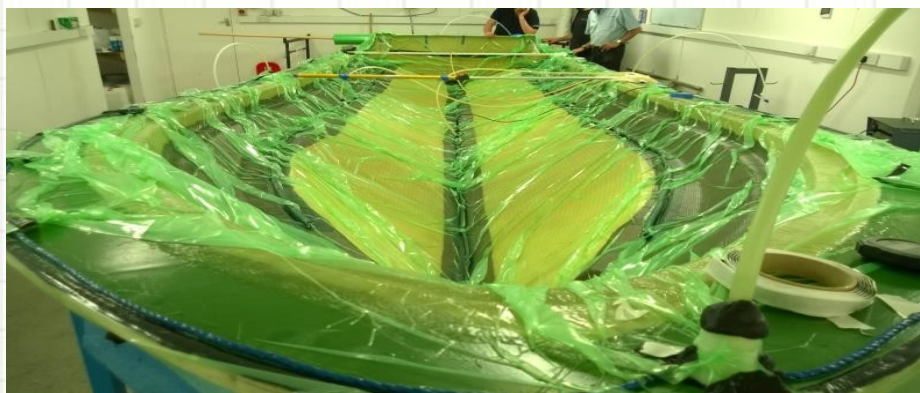
INNOVATIONS: Resin Infusion

- An injection machine was used to aid the infusion process. This machine withdraws resin and catalyst from their respective containers, mixes the 2 components in the correct ratio, pumps them around the system up to a mix head and when the appropriate time comes the resin feeds are opened and the vacuum pulls the resin through the mixing head and tubes to enter into the reinforcement filled cavity between the vacuum bag and mould.



INNOVATIONS : Completed Infusion (resin curing)

- Once the part is fully infused with resin, it is allowed to cure. Timing depends on the resin system and conditions, which may be hours or overnight.



INNOVATIONS : Joint Bonding of Longitudinal Stringer

INSTALLATION OF STRINGER



INNOVATIONS : Making a boat by the hand lay-up method

SET-UP OF TRANSOM



INSTALLATION OF TRANSOM



INNOVATIONS: RELEASE FROM THE MOULD



INNOVATIONS: Sub Assembly of hull and deck

Check all the wirings before sub assemble



Screwing the hull & Deck spacing of 150 mm



Assembling Hull & Deck



Installation of Bumper



INVESTMENTS:

- BORACAY ISLAND - PHILIPPINES
- FRP BOAT VS WOODEN BANGKA









ALS Boat Factory Aerial Shot (2018)



BIAP: SUSTAINABLE RECOVERY OF BOATING INDUSTRY IN COVID-19



The boating industry (production of boats, equipment, trade, services) is made up of 25 companies, over 75 % of which are SMEs. They employ hundred people directly with thousands more along the Boatbuilding. Philippines regions that are coastal, peripheral, islands rely on the Tourism industry.

As the impact of COVID-19 has been substantial with production sites temporarily closing or reducing their output in Transportations, Travel and Tourism activities severely impacted by restrictions and closures, this presentations:

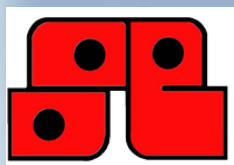
1. provides concrete recommendations for policymakers to support the survival of SMEs
2. presents valuable opportunities for boat building, while supporting sustainable tourism, and
3. proposes to reduce bureaucracy for a fast-track recovery of the sector.



BIAP: RECOVERY PLAN FOR COVID-19

1. Specific recognition and support for investment needs of the boating industry within national recovery plans.
2. Provide a better differentiation between maritime transport and recreational boating in terms of infrastructure investment needs, demands and resources (e.g. differences between commercial port and marina for recreational boats).
3. Recognize the role and potential of tourism for the economic development of regions through cohesion funding.
4. Development of concrete investment priorities for individual boating industry.
5. New support through recovery funds at national level that should be prioritized accordingly.

Thank you for your kind attention.



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**MARAMING
SALAMAT PO!!**