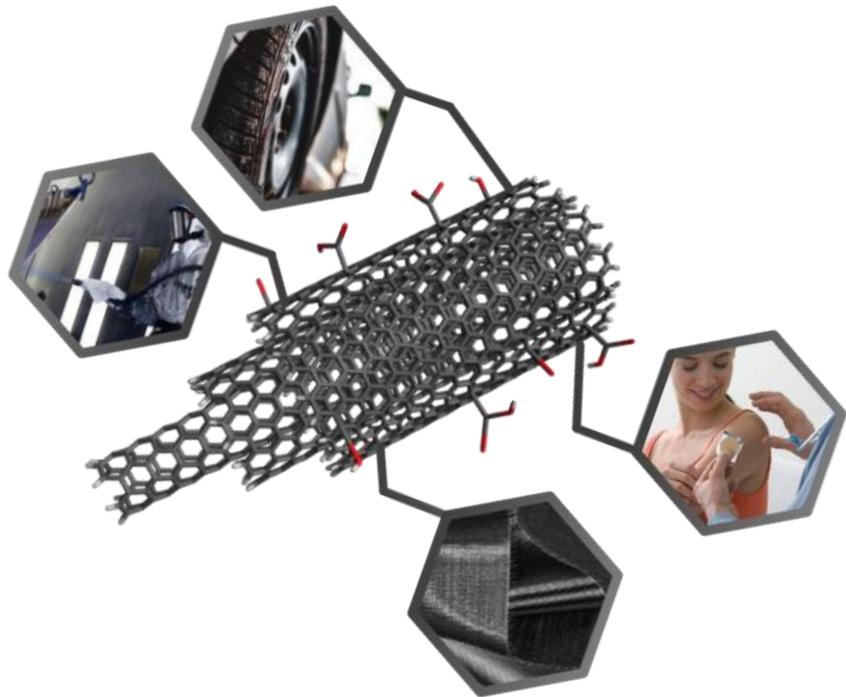


MOLECULAR REBAR® for Coatings

Increased performance for the coating industry using carbon nanotubes



Reduced cost of ownership

- Longer coating lifetimes 2-3 times
- Increased damage tolerance
- Reduced labor and coating cost long-term

Reduced coating cost

- Thinner coatings possible
- Reduced corrosion inhibitors like Zinc dust
- Possible 3 coats reduced to 2 coats

MOLECULAR REBAR®
DESIGN

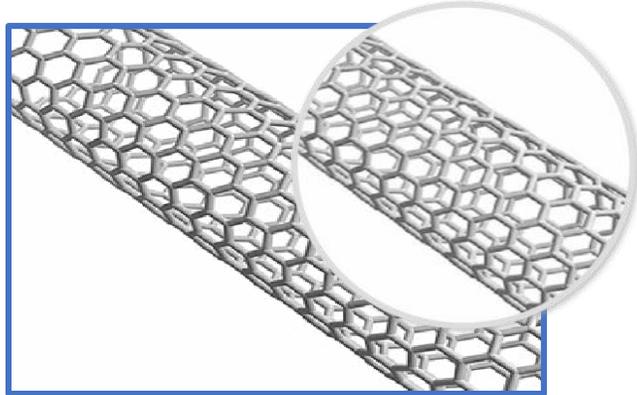
Transforming Businesses with Nanotechnology

Molecular Rebar Design – Who We Are

- Established in 2009, to develop and commercialize a breakthrough form of discrete, surface modified multiwall carbon nanotubes (MWCNT's), called MOLECULAR REBAR® (MR)
- R&D and Manufacturing based in Austin, TX including 100 tonne capacity, ISO 9001:2015 certified plant
- 69 Active Patents
- Fast-growth thru commercial partnerships for targeted markets for MOLECULAR REBAR®
 - **Black Diamond Structures:** former JV with SABIC. Energy storage, commercial globally in Li and Pb batteries
 - **Peak Nano:** Defense/Military applications
 - **Biopact Ventures:** Targeted biomolecule delivery into cells
 - **MECHnano:** Additive manufacturing (3D printing)



Carbon Nanotubes - History

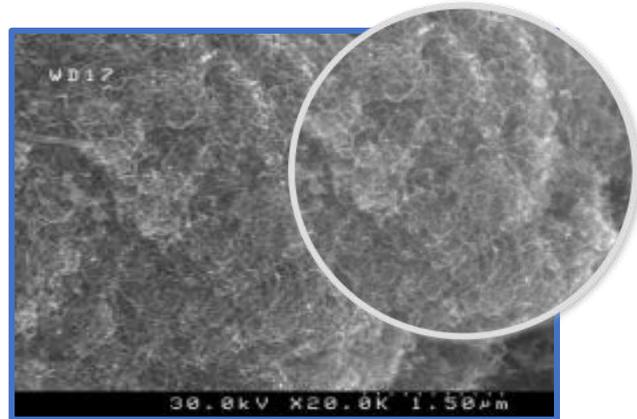


Discovered in 1991

- Heralded as the “Next Revolution in Material Science” (Smalley, Rice University)
- An incredible amount of money spent (including \$35 billion by the US government) with modest results in the first 20 years after discovery

Major Technical Issues

- Carbon Nanotubes (CNTs) clump together into non-uniform, “cross-linked” bundles as they are created
- Extremely difficult to disperse uniformly with much dusting causing environmental and health issues
- “Micro-clumps” not very valuable in most applications

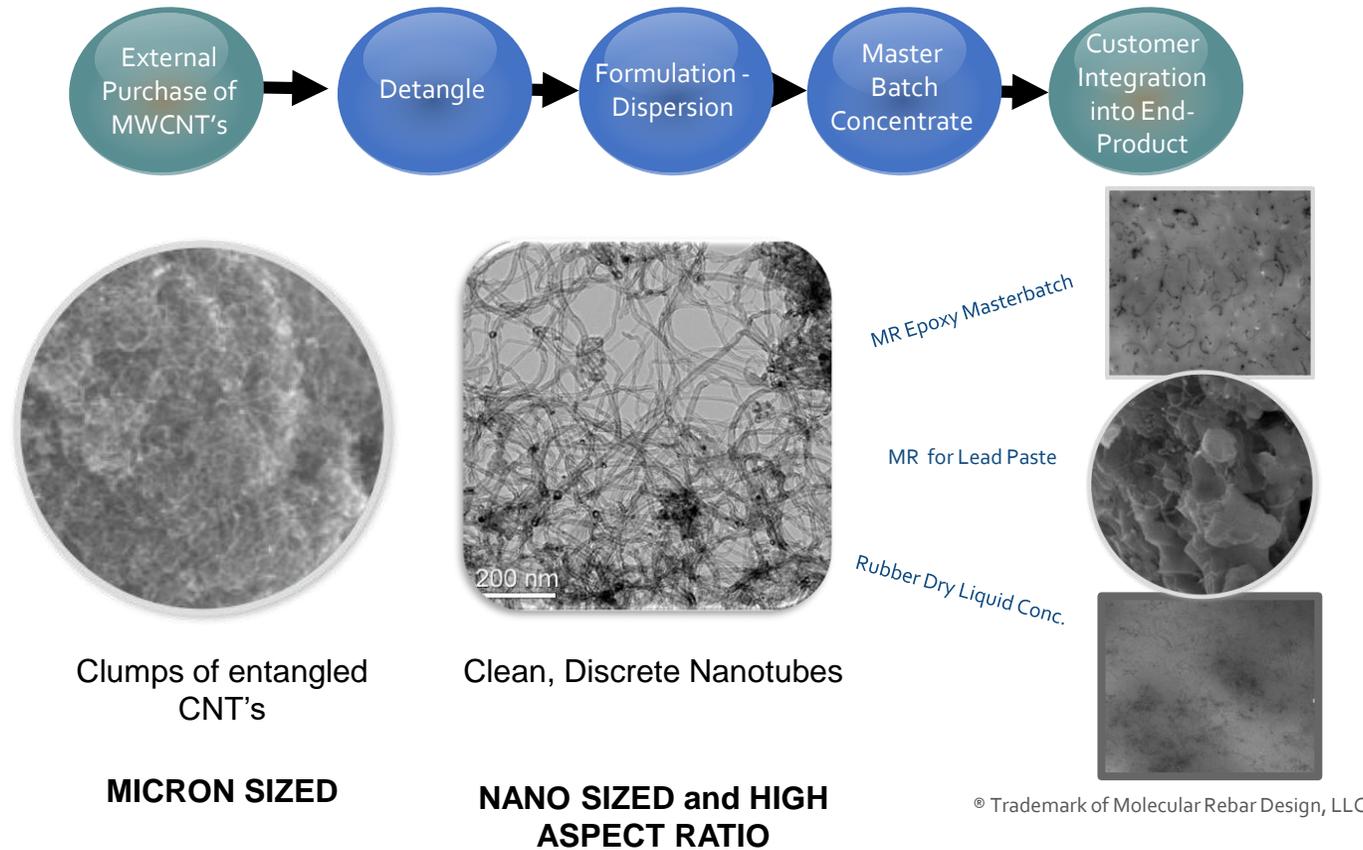


A nano tube is 10 thousand times smaller than a human hair, a bundle is about 10 times smaller than a human hair.

1 - 10 micron bundle has 6,000,000 individual tubes

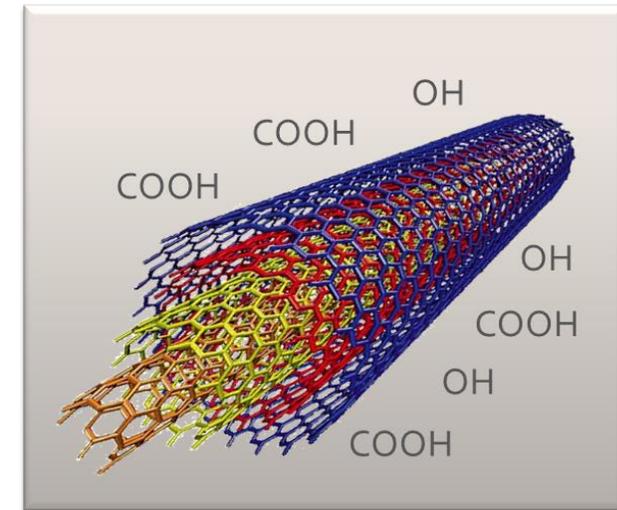
Molecular Rebar[®] (MR) Technology

MRD creates functionalized and discrete (individual) multi-walled, carbon nanotubes (MWCNTs).



MOLECULAR REBAR® (MR)

- MOLECULAR REBAR® means:
 - Discrete or individual nanotubes
 - High aspect ratio; 'fibers'
 - High purity
 - Lack of catalytic residue
 - Chemical functionalization
 - Basis for dispersion quality
 - Good interaction with paint and epoxy thru -COOH
 - Molecular-scale reinforcement
 - Like metal rebar in cement, but for coatings

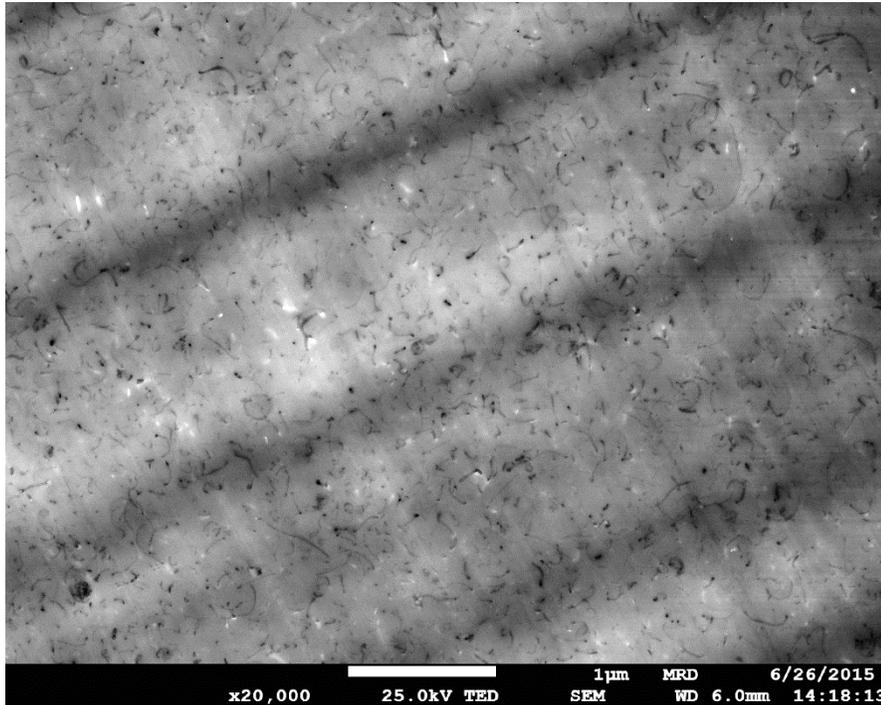


Molecular Rebar for Coatings



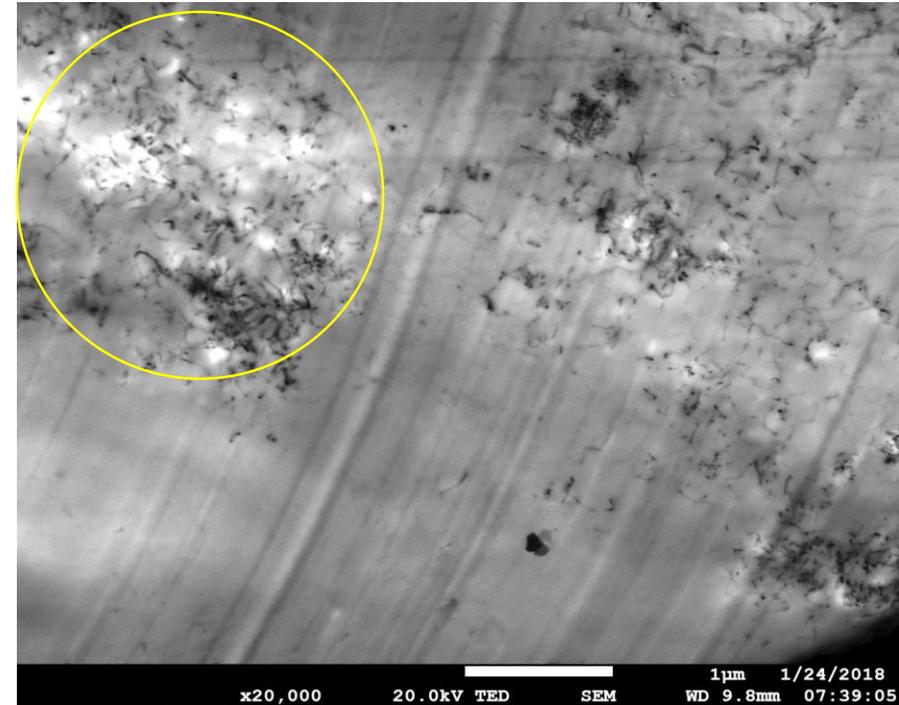
MOLECULAR REBAR® vs CNT Bundles in Epoxy

3% MR EPON 828



- Excellent dispersion of MR
- No agglomerations causing defects
- Very low catalyst residues

3% CNT EPON 828



- Inhomogeneous distribution of CNT
- Agglomerations/bundles (poor strength)
- High catalyst residues

Benefits of Molecular Rebar®

- **Mechanical or structural improvements to materials (melting points < 500C)**
 - Tear, impact, toughness and crack improvements
 - Reduced co-efficient of expansion and contraction
 - Improved adhesion and other surface phenomena
 - Control of crystal and microstructures
 - Strength and modulus
- **Transport properties**
 - Heat and electrical
 - Network forming, control of microstructures
 - Ion and molecular transport and storage
- **Electromagnetic fields effects**
 - Absorptions and reflections that can be controlled
 - Fields affect MR and MR effects fields

Combinations of the above (i.e. high adhesion and toughness)

Patent Strategy

- MRD owns patents, licenses rights
 - Licensee has available any claim in any patent for use in their field
- Global coverage
- Composition of matter for Molecular Rebar® (MR), blends, special formulations
 - Second version of basic composition patent now granted allowing for about 18 more years of protection (2037) for base material
- Applications in general markets
- Very integrated coverage
- Knowledge flow throughout user community

MRD Patents

- MRD has 69 Active patents with about 65 more in the patenting process
 - Examiners across the globe verify MRD has unique technology
 - Key patents are for composition of matter meaning no matter how a competitor makes mostly individual, discrete tubes alone or in blends, they will likely infringe MRD patents
- Process knowledge is in the form of Trade secrets and know how
- For key market applications MRD usually has 3 layers of protection with composition of MR, formulations of MR and application

MOLECULAR REBAR® - The Technology Advantage

Benefits MR Can Bring in Coatings

- 2-3X improved corrosion resistance
- Increased adhesion by 50%
- Improved impact resistance by 67%
- Improved durability and abrasion resistance
- For zinc rich, less zinc, less weight, better coating



MR Works by:

- Increased cathodic protection (Zinc rich primers)
- Increased adhesion and toughness
- Reduced water uptake



MOLECULAR REBAR® Product Forms

MOLECULAR REBAR® in Xylene - Wet Cake

- 8% MR in xylene – solid/bead-like form
- Add into commercial solvent borne coatings during normal mixing
- Typically adds <1% additional solvent volume
- **For coating/paint users/applicators**



MOLECULAR REBAR® in Epoxy – Master Batch

- 2% MR masterbatch in EPON828
- Replace a portion of epoxy when formulating a coating
- **For coating/paint producers**



MOLECULAR REBAR® in Water – Aqueous

- 3% MR in water – pours just like water
- Replace a portion of water when formulating water borne coatings
- **For coating/paint producers**



Performance in Coatings Applications

MOLECULAR REBAR® has been tested in a range of coatings with partners

- 1, 2, and 3-coat systems
- In zinc rich primers, mid-coats, 1-coat with corrosion inhibitors (organic and inorganic), water borne rubberized coatings etc.
- Marine, protective, machinery, construction
- MR is black or grey so color can be an issue to work

MOLECULAR REBAR® in coatings formulations

- Designed to be added to coating materials using existing equipment with almost no change to procedures
- For applicator use of existing personal protective equipment and clothing is sufficient
- Cleanup and spills are handled the same way as now
- There is no airborne MR in applying, use and grinding of epoxy with MR as MR does not come off epoxy

Protective/Marine: Wet Cake in Commercial Primers

- **Direct addition to existing coating formulations prior to application**
- **Improved Performance of Commercial Formulas demonstrated – example**
 - PPG Amercoat® 68HS 3-component system used
 - Only 0.025% MR on dry basis added on the total formulation weight basis
 - MR-Xylene Wet Cake used
 - Mixed using the same manufacturer instructions and standard power mixer
 - <1% additional solvent volume added to the final primer
 - Should be diluted with solvent as done normally

Protective/Marine: Extended Protection for Zinc rich Primers, Salt Fog Testing

**0.025%
Molecular Rebar®**
(total formula weight
basis)

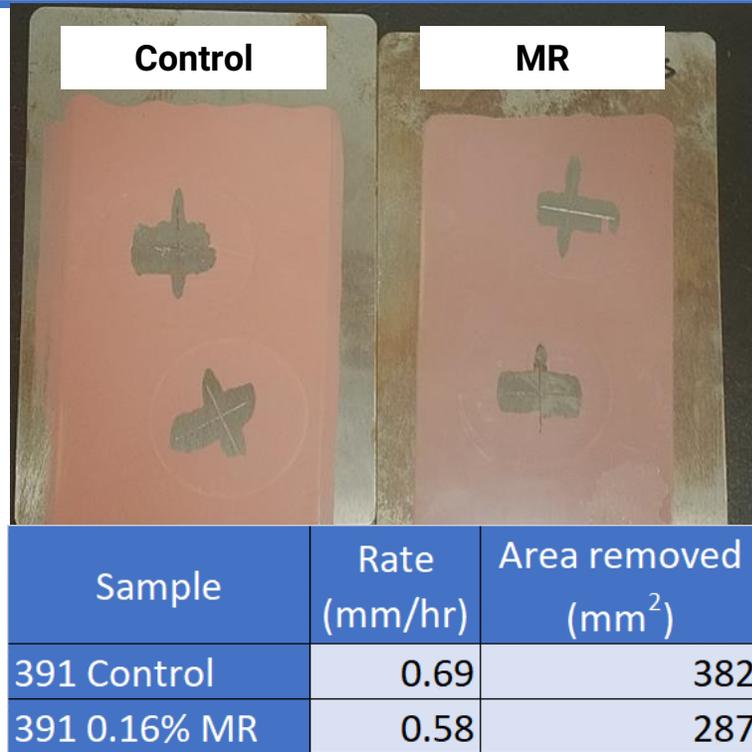


- Three-Component commercial Zinc Rich Epoxy Primer (>80% Zinc) –PPG Amercoat® 68HS
- Molecular Rebar® Added During Typical Mixing
- Substrate: Q-PANEL S-48 Ground Steel
- 50 microns D.F.T., no top coat
- Internally mixed, applied, and tested

Control - Blank



Internal: 1-Coat Coating, MR Improves Adhesion in Cathodic Disbondment Tests



- Samples scribed and electrochemically biased at -1V vs. sat. Ag/AgCl for 24 hrs. in 5% NaCl solution
 - Simulated cathodic corrosion
- Tape was then applied, detached coating area removed. Images were analyzed for the area removed.
- MR: 391 system: **25%** reduction in area removed; 550 system: **56%** reduction in area removed

Comparison to the Competition - MR versus Teslan

Attribute	MOLECULAR REBAR®	Teslan® (Tesla Nanocoatings)
CNTs to improve commercial zinc-rich primers	✓	✓
CNTs to improve lifetime of coating 2-3 times	✓	?
CNTs to reduce coatings from 3 to 2	?	✓

MOLECULAR REBAR® is a drop-in additive that the paint user or coatings formulator can directly use is positioned to extend coating lifetime 2-3 X and impact 50-100%

Tesla Nanocoatings positioning is to eliminate 1 out of 3 coatings but at a high cost of ~\$200/gal

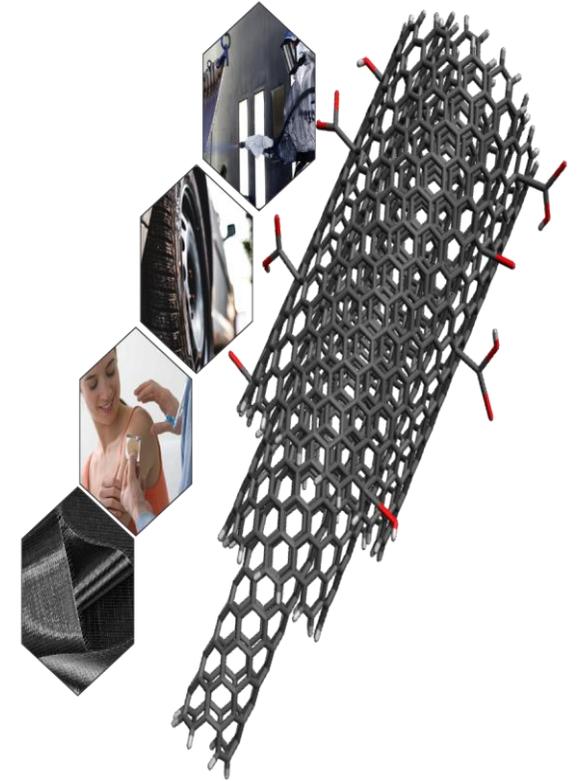
MRD is confident it can design a two-coat replacement for three-coat systems

The competition makes only zinc-rich primers/topcoat with CNTs

MOLECULAR REBAR® allows you to get the benefits of CNTs in any coating

MOLECULAR REBAR® for Coatings – Summary of Benefits

- Reduced long term cost of ownership
 - Longer coating lifetimes
 - Increased damage tolerance
 - Reduced labor costs – for a 2 times normal painting cycle only 1 Coat of MR is needed – saving the cost of prep, application and paint less premium for MR addition
 - Less risk of incidents both safety and environmental
- Reduced coating cost
 - Thinner coatings
 - Reduced corrosion inhibitors like Zinc dust
- Can be a Field addition to Commercial Coatings
 - Easy handling, safe and adaptable system
- Green!



Penetrating the North American Market for Oil and Gas, Marine, and Petrochemical Coatings – Indicative Structure

- To start a faster penetration of the market, the first market efforts will be to directly sell to end-users
- A Distribution Partnership including 3 coating experts who are in the oil/gas business will be formed
- The territory will be North America with target markets oil/gas, EPC and marine
- Using personal contacts develop oil majors, a platform operator, a ship owner and EPC contacts to start selling into the markets as a value sell
- MRD receives 70% of net income, distributors the balance
- There is a 20% of net income set aside as an accrual to cover any warranty issues (could be replaced by insurance in the future)
- Each partner pays their own costs
- Partnership sells additive which is based on Xylene (other solvents including water are possible) as O/G, Marine and EPG industry uses solvent based coatings

Marketing for Distribution Partnership

- Industry is looking for new technology to cut their long- term costs related to control of corrosion
- Selling proposition is to reduce total cost of ownership related to prevention of corrosion using corrosion coatings–
 - How many times will the facility over its lifetime need to be repainted including preparation, coating labor and the coatings costs
 - Calculate the same cost using twice the life of the coating and with doubling the price of the paint
 - Calculate the value creation using MR compared to today's approach
- Use partners to persuade the oil industry to try the coatings
- Guarantee extra lifetime at 2X by rebating cost premium of MR paint
 - Set up a warranty accrual fund for any issues, reverse with 2X lifetime performance
- Use industry events and meetings to drive home the message

Estimated Sales and Revenue Forecast for Distribution Partnership

- 4 initial market application with customers
 1. Oil and Gas Market - Major oil and gas producer such as BP, Exxon, Chevron etc.
 1. Only 2 used in estimate
 2. Platform Operator - Platform operator who has 444 platforms in Gulf of Mexico
 3. Ship operator who has 200 ships from 90-525 feet long
 4. Major EPC user
- Each category participant wants this type of technology and the Distribution Partnership has a relationship with the leadership to drive this type of new technology
- The value is assumed to be a 100% upcharge on the paint with the savings of labor going to the end user
- The MR additive will be applied into existing paint purchased from paint companies and added before solvent is added

Estimated Sales and Revenue Forecast

- These estimates are for a reasonable ramp-up for a fraction of the market with just the initial customers for the Distribution Partnership
- A warranty pool at 20% of gross margin is included -- reversible in the future based on performance

	2020	2021	2022
Oil & Gas Market	\$30,000	\$210,000	\$375,000
Platform Market	\$30,000	\$210,000	\$375,000
Shipping	\$12,000	\$60,000	\$120,000
EPC	\$0	\$30,000	\$120,000
Total Sales	\$72,000	\$510,000	\$990,000
Gross Margin	\$67,000	\$475,000	\$920,000
Warranty (20%)	\$13,000	\$95,000	\$184,000
Adj. Gross Margin	\$54,000	\$380,000	\$736,000
MRD Margin	\$37,500	\$266,666	\$515,000

Joint Venture or Sale of Technology by MRD – Indicative Structure

- Would include Distribution Partnership on whatever terms partnership was formed for the focus markets
- Worldwide with all coating applications
- Would include ability to sub-license
- MRD would want a 2% royalty to maintain IP portfolio from which rights would be granted or licensed
- In due diligence, there are results of many trials adding MR to epoxy and then formulating with water and solvents, a flexible approach on product form is possible
- Investment for launch at this scale will be \$2.5 million with cash positive projected in year 4
- A joint development effort or license to develop or purchase this technology are options
 - An option to purchase or license is a possibility