

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



The following information is being provided by Pavement Technologies International Corporation, PTIC, in response to RFI-DeployableHMAPlants, Posted May 15, 2009. For further questions or clarification please contact Mark Reeves – President of PTIC at 518-218-7676.

MARP TECHNOLOGY BACKGROUND: The PT-PRO Series Mobile Asphalt Recycling Plant, MARP, was designed to recycle RAP materials (broken asphalt chunks and millings) and to produce virgin HMA from raw ingredients. The MARP was first introduced in 2001' as a highly mobile system for in-situ recycling of asphalt pavement surfaces and is commonly used to repair and replace asphalt pavement surfaces on roadways, walkways and parking lots (Images 1a, 1b).



Image 1a



Image 1b

In 2007 the first North American customer began employing the MARP as a semi-static system in which a waste feedstock of RAP was stockpiled and fed into the recycler to produce a continual stream of recycled HMA. This system of use is becoming popular and is now employed by customers in the US, Spain and England. Because feed stock is supplied by a multitude of sources, the quality of the RAP will vary and as such an additive or modifier may be used to improve the workability of the mix and reduce required mix temperature. The final HMA product is typically loaded into a dump truck or hotbox and later placed by hand or paver at the jobsite using customary methods (Images 2a, 2b).



Image 2a



Image 2b

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



The most common use of the MARP system has been for recycling RAP, as it offers a multitude of benefits over traditional plant purchased hot mix. Most significant, has been the reduced reliance on local hot mix plants, the cost savings of producing HMA from otherwise waste materials and the ability to employ the plant anytime day or night and during winter months when asphalt plants are typically closed. MARP recycled hot mix typically yields a cost reduction of 30% or more over plant purchased HMA while also providing significant environmental benefits. Green conscious operators benefit from a carbon emissions reduction when compared with traditional plant purchased hot mix.

MARP ADAPTION FOR AIRFIELD WORK: Over the past two years, considerable interest has arisen in the MARP’s ability to produce virgin HMA, particularly when considering MARP’s highly deployable design, low cost and ease of operation. The primary appeal to private contractors is MARP’s ability to produce quality HMA to specific mix designs in hard to reach areas where traditional high volume HMA plants are not available and those areas where plant produced hot mix costs are highest. Contractors using MARP gain a competitive advantage while municipalities appreciate the permanent nature of the repairs and significant maintenance cost reductions.

For military and airfield applications (Image 3a) the MARP system is well suited and offers the ability to be rapidly deployed to the repair site. Locally available aggregates are stockpiled along with pre-packaged super sacks of pelletized asphalt to later be mixed and heated within the MARP. The result is an efficient and highly effective system for rapid runway repairs. Nitech Corp, located in, South Pomfret, VT USA, manufactures a pelletized asphalt, Nipak®, which can be produced in accordance with customer specific mix design (Image 3b) and has shown favorable performance in recent studies. The asphalt is stored at ambient temperature in free flowing pellets which evenly distribute themselves throughout the mix load. The MARP mixes and heats the aggregate and asphalt pellets producing a 5 ton batch of virgin HMA in less than 20 minutes.



Image 3a

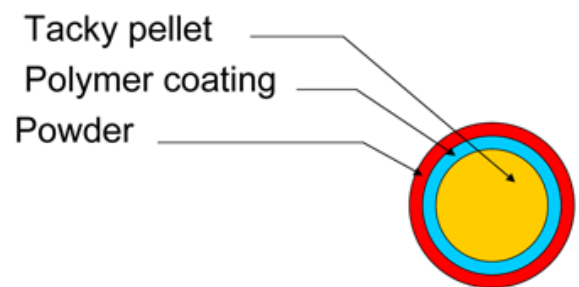


Image 3b

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



DEPLOYMENT CAPABILITY BY C-130H: The MARP incorporates batch plant technology into a compact, highly mobile system. The all-in-one design allows the machine to be rapidly deployed by ground, sea, rail or air. The plant is shipped as a single fully assembled unit with the possible exception of a customized top loading bin that can be bolted on upon arrival. The overall weight and dimensions of the MARP (Model 5000) will allow the machine to fit inside of a C-130H plane. The drawing below illustrates the expected fit ratio of the MARP within the Hercules C-130H.

Overall dimensions PT5000 MARP: Length 8.81m x Width 2.14m x Height 2.462m. weight 10,800 kg

Cargo hold capacity Hercules C-130H: Length 12.31m x Width 3.12m x Height 2.74m. weight limit 19,090 kg

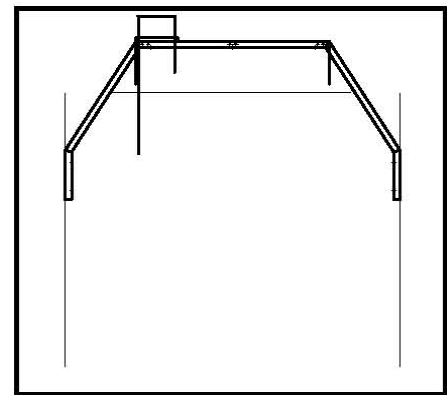


Image 4a

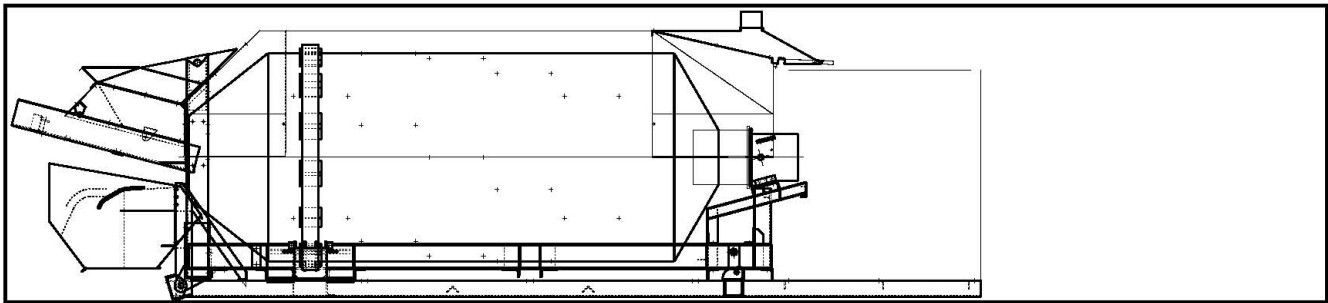


Image 4b

AIRFIELD REPAIR PROCESS IMPROVEMENTS USING MARP: One of the primary benefits of the MARP system is that it combines the capability of a batch plant into a compact and highly mobile design that can be quickly mobilized to the airfield repair site. Repairs must be made as quickly as possible to restore the airfields operational capability, as closure of the runway may not be an option. Additionally, the repair must be capable of sustaining the weight of aircraft during landing and takeoff. The MARP system offers a turn-key solution for producing HMA to precise specifications in a system that is simple to use. A truck or trailer mounted MARP can be mobilized directly to the site of repair and driven on or off the airfield as often as needed in order to accommodate incoming or outgoing air traffic without disturbing the production process. Material may continue to be heated and mixed during transit and can be kept within the mix drum at desired temperatures for some time. Such mobility helps ensure the safety of the work crew and reduces the risk to airplanes and cargo. Locally available/stockpiled aggregates can be combined in the mixer with pre-packaged asphalt to quickly produce the

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



necessary quantity of hot mix. Hot mix asphalt is safely contained within the mixing drum during heating. One of the most striking advantages of the MARP system is its ability to be operated without the need for extensive training. The system is designed for ease of operation with all functions fully operable from a single control panel. Once the hot mix is produced, standard lay down procedures apply. The overall MARP production process is relatively simple and allows the paving operations crew to carry on their normal course of work without needing to adapt to an entirely new process and methodology.

MANUFACTURING & DISTRIBUTION: RSL Ltd. is a fourth-generation family-run engineering company based in Leicestershire, England, specializing in quarry and asphalt plant equipment and has been responsible for the invention, design and manufacture of the MARP system over the past six years. The MARP system is marketed in England under the product name: VEB 5000 Hot Asphalt Recycler and Mobile Asphalt Recycler, MAR.

Pavement Technologies International Corp., PTIC, based in Albany, NY is the North American distributor and worldwide armed services distributor of the MARP system. The MARP system is marketed in North America as the PT-PRO 5000 Mobile Asphalt Recycler and Mobile Asphalt Recycling Plant, MARP. PTIC has specialized in mobile recycling plants for the past 10 years. The company's founders previously owned and operated a NY based paving company for 15 years and bring a wealth of practical field knowledge to their customers.

TECHNOLOGY READINESS LEVEL: The MARP system complies with the requirements of Technology Readiness Level (TRL) 9. The MARP has been used by customers in the field for the past 6 years and extensive independent testing has been done to evaluate various aspect of the machines performance with satisfactory results. Recycled RAP and virgin HMA have also undergone multiple independent quality tests with favorable results. The MARP system is a mature and proven technology that has generated an extensive body of research by independent councils and corporations in the UK as well as the body of research conducted by the USAF. The MARP, RSL VEB 5000 complies with and carries a CE marking in the European Economic Area.

MARP has been used continuously by several operators since its inception in 2001. RSL carried out the majority of its early development work with Staffordshire Highways in the areas of health and safety and working practice. Staffordshire County Council and Enterprise plc of the UK have been successfully using the MARP as an integral part of their recycling programs. The MARP process has been used extensively by councils in Leicestershire, Cornwall and Oxfordshire England, by multinational companies Enterprise and Accord of the UK, by 6 private corporations in the USA and by private enterprises in South Africa, Australia, Spain, Congo and Nigeria.

Nitech, manufacturer of the pelletized asphalt, has worked with both the USAF and NCAT(National Center for Asphalt Technology) for over 3 years to develop and qualify mix designs and process which will perform to the rigorous standards of airfield designs including rut resistance under very high loading and to develop a hot mix delivery system for military airfields worldwide. Nitech has met and exceeded the design criteria under lab conditions and compare favorably with standard batch plant mixes with hot mix produced under controlled conditions.

ENVIRONMENTAL AWARDS: The MAR process was presented with a Silver Gilt Award from the Staffordshire Environmental Business Network for recycling performance in 2006/07. For carbon emission reduction the process was awarded first place in the Staffordshire Sentinel Business Environmental Awards 2007/08, sponsored by Michelin.

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



ENVIRONMENTAL: Independent Emission and Noise studies have been conducted by engineering companies in both the USA and UK. Scientifics Limited was commissioned by RSL Group Limited in June 2008 to carry out stack emissions monitoring to determine the release of total particulate matter from the VEB 5000 (PT-PRO 5000) and noise assessment testing. The executive summary noted, “The results of these tests demonstrate that this Plant is being operated with a total particulate matter concentration of 55 mg/m³ and a bitumen fume concentration of 2.3 mg/m³.” Complete test results are available upon request. For those seeking the most environmentally sound system possible, a baghouse using a cartridge filter system may be added to complete the system.



Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



MARS PROCESS DESCRIPTION & BENEFITS:

Ease of Operation: The MARP is built for ease of operation and requires just one operator to control all functions. Loading the plant with materials can also be accomplished by the operator without need for a second person. However, it is desirable for a second person be assigned to this function in order to speed up and maximize the efficiency of the process. The operator of the backhoe or bucket loader is typically a member of the paving crew. The machine is simple to operate and adequate proficiency can be gained after just a few days of operation. Full proficiency can be expected after approximately one week of operation. A short learning curve should be expected and will support the use of this equipment by a rotating shift of GIs.

Loading: The loading process can typically be completed in 5 minutes or less. Material is loaded via a bucket loader or backhoe into the charging-bin located atop the mixer. A hydraulic ram situated at the bottom of the loading bin moves back and forth pushing material into the drum at a fixed rate and breaking any oversized RAP chunks in the event that RAP is being used. Overfilling is prevented by load cells and a weight indicator fitted to the drum, which alert the loading machine driver when the drum is full. The system is fitted with an audible alarm and strobe light to indicate that the maximum 5 ton load of material has been reached (Images 5a, 5b).

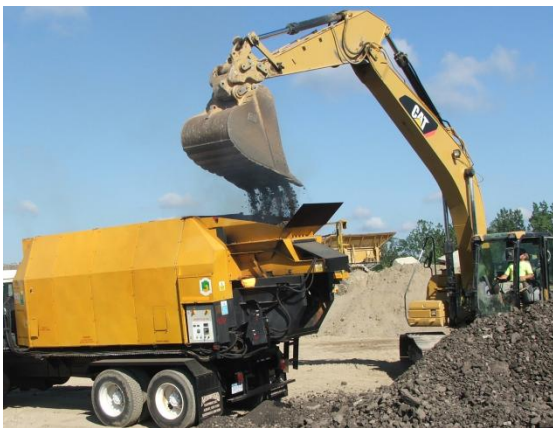


Image 5a
Image 5b



Unloading: The entire contents of the drum can be unloaded in approximately 5 minutes or less. The full batch can be dumped onto the airfield, into a loader bucket or stockpiled. The rear mounted surge-bin with its bottom mounted hydraulic gate, allows material to be released in stages to accommodate loading into wheelbarrows. For expediency on airfield repairs a loader bucket, small grader or paver can be used to rapidly spread the hot mix prior to compaction. (Images 6a, 6b).



Image 6a
Image 6b



Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



Cleanup: The MARP requires virtually no cleanup other than to fully empty the drum and charging bin at day's end. The rear surge-bin has a hydraulically activated discharge gate at the bottom which allows material to be discharged into wheelbarrows with great ease. On machines containing a rear surge-bin, spraying the inside of the metal bin with a quick release agent between batches prevent asphalt build up (images 7a, 7b).



Image 7a
Image 7b



Output: The MARP (Model 5000) reliably produces a 5 ton batch of 300F virgin hot mix in 20 minutes or less regardless of moisture content and time of year. For airfield repairs, damaged pavement will require saw cut and removal of the damaged area, introduction of new base materials and proper base stabilization. With an airfield maintenance crew mindful of proper staging, the MARP could be quickly mobilized with HMA produced and ready for lay down at the moment the repair area is ready to receive hot mix materials. While the runway is being prepped, the MARP can produce and stockpile hot mix in advance. Once the repair area is ready to receive hot mix, the HMA can be moved to the repair area by bucket loader or dump truck to complete the work.

Construction: The mixing drum incorporates an array of bolt on/off lifters (Image 8a). For producing virgin HMA, the lifters are pre-arranged at the factory in a pattern that maximizes the cascading of material throughout the heat source in order to speed up drying of the aggregate and maximize production efficiency. The material is heated by a diesel fired burner system which fires down the center of the drum. The heating system utilizes a maximum fuel consumption of 18 gallons per hour of diesel fuel.



Image 8a (note: exact lifter arrangement is 'not' shown)

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



A large electric exhaust fan draws hot air through the length of the drum evenly distributing heat to the HMA and eliminating exhaust emissions through the loading port. Material is heated for a preset amount of time after which the burner shuts off automatically. The MARP is designed to allow for either static, trailer or truck mounting. To maximize mobility and compactness, the MARP is best mounted onto a truck. This allows the MARP to be driven directly onto the airfield for in-situ repairs while allowing rapid retreat when needed.

Serviceability: The MARP incorporates an engine room to allow servicing while sheltering the operator from inclement weather and protecting the more vital and sensitive components such as the engine and generator. The exterior panels bolt on and off and allow easy access to the drum and other components. Current MARP systems generally incorporate an interim tier 4 John Deere generator set and a Riello burner system. The burner system and engine both operate on diesel fuel (Images 8a, 8b). The MARP is dually equipped with an electrical adapter to allow the machine to be powered via 3 phase electric.



Image 8a
Image 8b

Safety: The MARP incorporates a variety of safety features to further simplify the operating process. A temperature policeman monitors the exhaust stack temperatures automatically and will shut the burner down if a preset maximum temperature is exceeded. This prevents accidental overheating of the HMA. The burner operates via a countdown timer and automatically shutdown after the preset time has expired. Manual safety shut-down switches (Image 9a) are situated on all sides of the machine. The control panel (Image 9b) is set curbside for safety and can be set in a position that best accommodate the safety requirements of the user or the country in which it will be used. An optional tether or wireless remote can be added for remote operation.



Image 9a
Image 9b

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
 (888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



Operational Costs:

The chart below illustrates the cost of operating the MARP when recycling RAP materials. When producing virgin HMA using pelletized asphalt at 5%, the cost of the asphalt component is the greatest overall cost within the system. The cost of aggregates, diesel fuel and operator costs are nominal in comparison. The total cost of HMA may be as much \$250.00 or more per ton, 300% more expensive than conventional local plant produced HMA. However, it is necessary to note that the amount of hot mix produced for an airfield repair is generally minimal yielding an overall insignificant cost. The mobile MARP technology is proven and the process works effectively. The combined technology of the MARP and pelletized asphalt system provides a convenient kit that is readily deployable and can be utilized in just about every setting regardless of weather or temperature. In consideration of these and the many other benefits already outlined, one can readily conclude that the MARP kit provides excellent value and exceptional performance.

RECYCLING COSTS

ITEM	Formula	Tons/Hr	Cost/Ton	Cost/5ton	Cost/80ton
RAP Material & Processing	Cost/ton for RAP material & Processing	10	\$5.00	\$25.00	\$400.00
Burner Fuel	20. gph burner * (\$2.25 per gallon) * (.83 hour run time per batch)	10	\$3.74	\$18.70	\$299.20
Engine Fuel	5 gallons per hour * (\$2.25. per gallon)	10	\$1.13	\$5.65	\$90.40
Operator	\$40.00 per hour.	10	\$4.00	\$20.00	\$320.00
Additive Material	For the sake of this pricie analysys were assuming the additive is: Hydrolene, using 1/2Gal per ton * \$7.70 per gal. The amount of additive needed may vary from load to load.	10	\$3.85	\$19.25	\$308.00
COST / Ton			\$17.72	\$88.60	\$1,417.60

Pavement Technologies International Corp.

1525 Western Ave, Albany, NY 12203
(888)999-2660 (518)218-7676 Fax:(518)218-7999
www.PavementGroup.com www.AsphaltRecycling.com



Specifications: The following list provides some of the basic machine specifications.

Model Number	PT-PRO 5000
Length mm	9100mm, 29.86feet
Width mm	2370mm, 7.78feet
Height mm	2480mm, 8.14feet
Weight Kg, pounds	10800Kg, 23,810Lbs
Engine Type	John Deere
Output Per Hr (UK Tons)	15
Burner Type	Riello Press 3
Low heat Nozzle size, US Gal/Hr	8.5 x 45° (B), Danfoss
High heat Nozzle Size, US Gal/Hr	10 x 45° (B), Danfoss
Air Damper setting - high fire	7
Air Damper setting - low fire	1
Combustion Head setting	0
Electrode Gap Setting, mm	4
Burner Fuel Pressure (PSI)	175
Fuel Type	Light Oil
Fuel Consumption, Per Ton	18gallons/hour
Hydraulic System	RSL/515360H
Electrical System	RSL/3759E
Gearbox Type	Brevini
Fuel Filter	Fleetgaurd
Motor Kw on Drum	18.5
Motor Kw on Fan	5.5
Colour Code	Customer Choice

This information has been provided by:

Mark Reeves - President
Pavement Technologies Int'l. Corp.
1525 Western Ave. Albany, NY 12203 USA
W: 518-218-7676 F: 518-218-7999
mreeves@PavementGroup.com
www.pavementgroup.com

