Applying modified bitumens takes new skills and procedures

The growing use of reinforced modified bitumen (RMB) has made it important for contractors and their workers to understand proper RMB application procedures and techniques. These procedures may vary from job to job because of differences in materials or conditions. The wide variety of RMB products makes it impossible to write one set of application procedures to cover all situations.

Some practices, however, can help assure a safe and durable installation regardless of the materials used or the conditions encountered. The following procedures and guidelines are some of the techniques I have found helpful in working with RMB systems.

RMB use rises steeply in 10 years

Before discussing RMB applications, it may be useful to review the expansion and diversification of the industry. The number of RMB products available to U.S. contractors has grown from the handful that was marketed in the '70s to the host of brands and formulations being offered today. The first RMBs were introduced into this country in late 1975 from Europe, where they were developed in the mid-1960s.

My first encounter with an RMB product was at the 1974 NRCA Convention in New Orleans. I was part of a small group of roofing contractors that was invited to witness a demonstration of an application during the show. The following year, RMBs entered the U.S. market.

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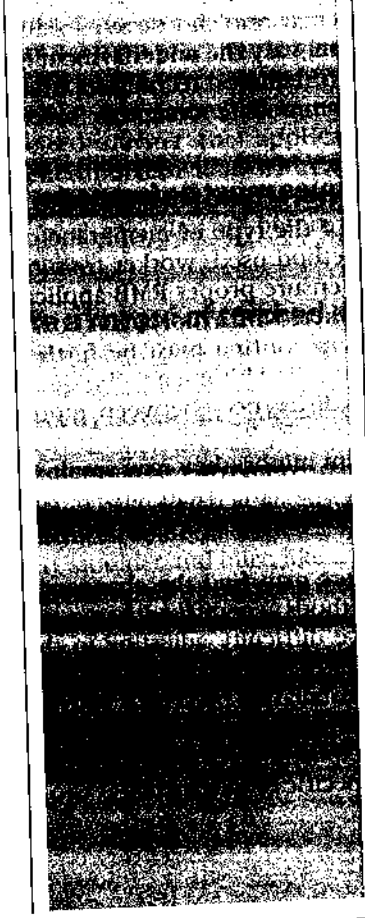
BUR knowledge helpful but not enough

by Ray Johnson



The products caught on quickly in this country. Contractors found that RMB systems performed well, and application was less labor-intensive than traditional BUR. One of the few hindrances to the products' growth in the United States was the length of time it took to receive the materials from Europe. This problem diminished in 1978, when the first manufacturing plant was built in this country.

Today, according to the figures I have seen, there are more than 22 plants manufacturing RMB in the United States. Some of these plants are owned and operated by U.S. built-up roofing manufacturers, some are operated by European companies, and some are operated by new companies formed exclusively to manufacture RMB.

The rapid growth of the RMB industry probably will not diminish soon. RMB is the fastest growing roofing product currently marketed in the United States. Some estimate that by the year 1987, sales of RMB will surpass all other types of single-ply or built-up roofing.

RMB offers diverse choices

The RMB products being marketed today offer a wide assortment of bitumens, modifiers, reinforcements and surfacings in varying combinations. Most RMB products are modified with either atactic polypropylene (APP) or styrene-butadiene-styrene (SBS).

The most common reinforcements are polyester mats, fiber glass felts or fabrics, thermoplastic rubber sheets and plastic film. Some manufacturers combine these reinforcements to add one product's performance advantages to another's. Polyester and fiber glass are the two reinforcement materials most commonly combined.

Surfacing is another component that may vary from one product to another. Surfacing products may be either factory- or field-applied. Granules, metals such as aluminum or copper, liquid-applied surfacings and gravel are used to protect the membrane from traffic, ultraviolet radiation and the elements.

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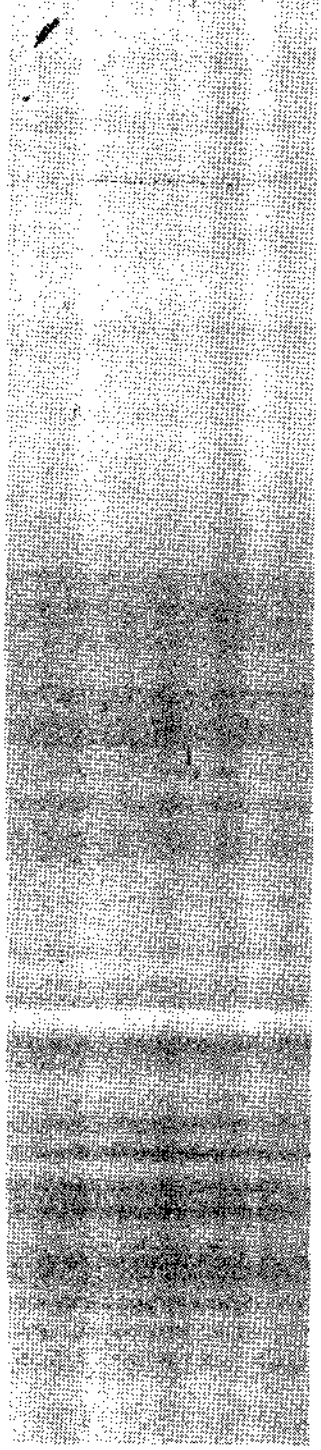


The large number of RMB materials available has made it difficult for contractors become familiar with all of the products or manufacturers currently in the marketplace. The February 1986 edition of NRCA's *Commercial, Industrial and Institutional Roofing Materials Guide* lists 40 RMB manufacturers and 129 different products. To add to the confusion, there are manufacturers dropping out of the market and others adding RMB products to their lines on a regular basis. Even the products that have been on the market a while have been modified and improved with new bitumen formulations or reinforcements.

All systems not applied alike

RMB roofs also differ in the way they are installed. Some membranes are designed to be welded to the substrate with their own bitumen, which the applicator melts with a hot-air or propane torch. Other membranes are applied with hot asphalt. A third type, known as a "peel-and-stick" membrane, is adhered with mastic that has been factory-applied to the modified bitumen product. Some RMB membranes may be applied in a variety of ways, while others offer more limited choices. The manufacturer's instruction should be checked carefully if there are any doubts about the correct way to proceed.

Contractors may also choose to partially adhere a system, vary the underlayment or change other installation techniques in an effort to accommodate design or safety considerations.

New techniques must be learned

Regardless of the type of membrane or installation method used, worker training is essential to ensure proper RMB application. Even workers with a thorough knowledge of built-up roofing must be further educated in modified bitumen techniques. Although the differences between modified bitumen and BUR application procedures may seem minor, they may result in mass confusion in the field unless the workers are educated before application begins.

Some workers may find the changes in application methods very difficult to master. They may have difficulty adjusting to the new techniques or the smaller margin for error an RMB installation presents. Contractors can help their crews make the transition by carefully explaining to them the RMB installation's specific requirements.

Before attempting to train the workers, however, the contractor and his supervisors should review the manufacturer's requirements for the application. It should not be assumed that the procedures learned for the last RMB job will apply to the current job. During training, the workers must be made to understand that the installation techniques they are learning may be peculiar to the product being used.

Contractors who fail to review the manufacturer's requirements before the job begins may end up with embarrassing callbacks. One contractor learned this lesson the hard way when he was called back to an RMB job installed on a sloping roof. Upon investigation, he discovered that his crew had adhered the APP-modified bitumen membrane with mopped hot asphalt rather than torching it on as required. The mistake could have been easily avoided if the crew had checked and followed the manufacturer's instructions.

While studying the RMB product's requirements, the contractor should also determine its compatibility with the system's other components. Should either the materials or the application techniques being used be incompatible with other elements, it may result in damage to the entire assembly. Installing a torched-on membrane directly over a combustible insulation, for instance, could cause a serious and costly fire.

Some field-applied surfacings may also be incompatible with the RMB membrane. I have had a difficult time finding liquid-applied white coatings that may be used successfully with APP-modified sheets. Most of the products tend to peel and flake after a period of time. My only suggestion is to check the manufacturer's specifications and use only a recommended surfacing with the RMB product.

On to the roof

Once everyone is thoroughly familiar with the job's requirements, the RMB installation can begin. Before the modified bitumen membrane can be installed, however, the surface must be prepared. As with any type of roofing, RMB systems require a clean, dry and smooth substrate. The most durable systems are the ones installed over sloped surfaces that provide positive drainage.

Usually, BUR equipment may be used satisfactorily for an RMB application. It should be remembered, however, that a roll of RMB weighs much more than a standard roofing felt, sometimes tipping the scales at more than 100 pounds. Handling these cumbersome materials requires extra care. Workers should make sure that the carts and hoists they are using to move the rolls are capable of withstanding the added weight. The workers themselves must be careful when lifting or carrying the materials to use the proper equipment, if available, or employ the correct lifting techniques when hand-carrying is necessary.

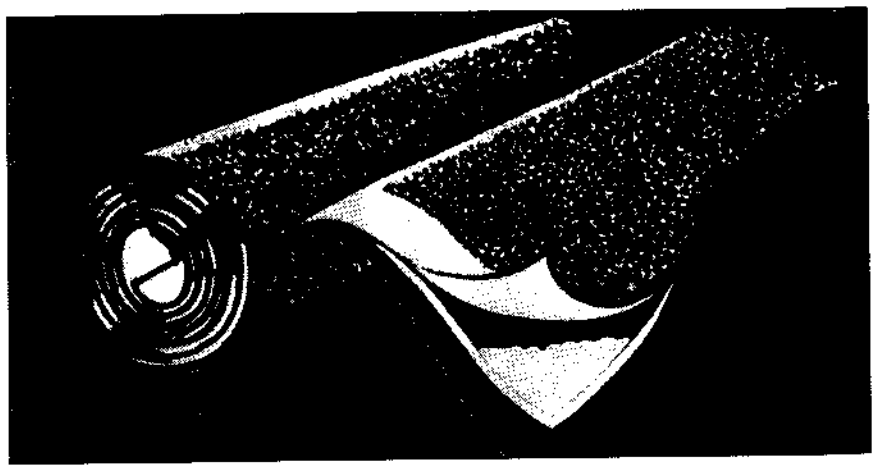
Properly handling and storing RMB materials before they are installed will help avoid damage that could affect the products' performance. One of the most important rules to remember is to always store the rolls on end to keep the ends from being flattened. Workers should also remember to:

- make sure the building's structure can handle the weight of the rolls if they are to be stored on the rooftop;
- keep the materials dry, both in the warehouse and at the jobsite;
- avoid mashing the rolls, which could make them difficult to unroll; and
- avoid practices such as dropping or throwing rolls that could lead to punctures or other damage.

Take precautions during work

During the actual RMB application, the workers must observe certain procedures. Especially careful attention must be paid to the seams if a successful RMB installation is to be achieved. The seal at the seam must be continuous or the roof will fail. One way to produce a strong, watertight seal without applying a great deal of additional heat is to weld the seams together while the membranes are still hot from the torch.

Any application in temperatures below 40F presents its own problems. Some RMB products may actually crack when unrolling under very cold conditions. If an RMB system is to be applied in cold weather, the manufacturer's instructions should be followed carefully.



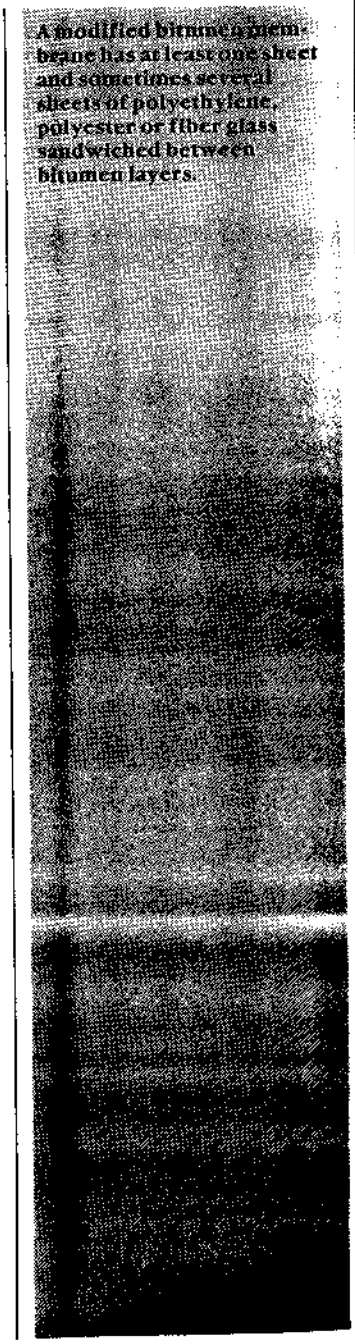
Carrying a torch for RMB

Torched-on systems require special care to prevent under- or overheating the membrane. My experience indicates that more heat is required to apply an SBS-modified system than an APP-modified product. An underheated membrane will be poorly adhered to the substrate. Overheating may damage a polyester-reinforced sheet or cause a fiber glass-reinforced sheet to separate. Too much heat may also cause the factory-applied surfacing, especially if it is a granular surface, to slip or distort. One way to evenly distribute the heat and increase worker productivity is to use a multiple-torch machine.

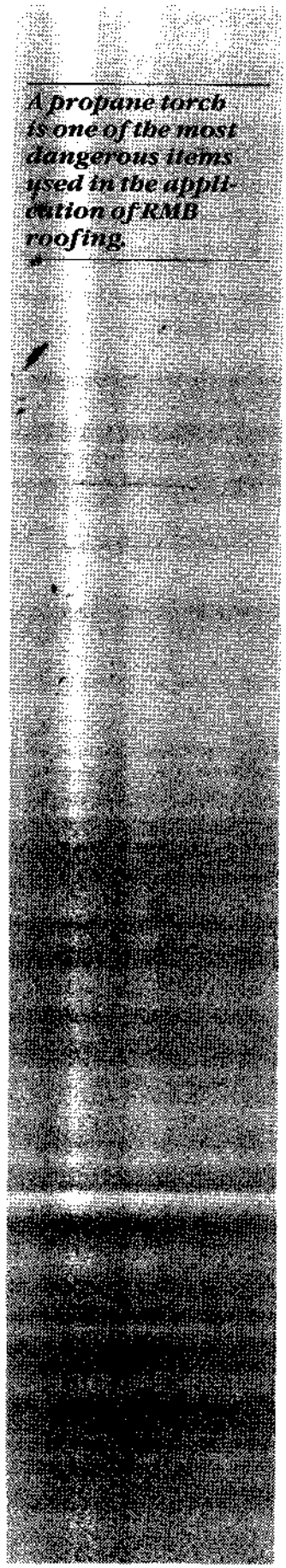
If the RMB product that is to be torched is backed with a polyethylene film it should determined if the film may be melted during the application. If the melted polyethylene will cause problems in the completed roof, it may be necessary to peel the film off before applying the product.

Fire a hazard of torched systems

Fire is an ever-present hazard during a torch application. Torching an RMB roof directly over an untreated fiberboard product such as a cant, edge strip or roof insulation is extremely dangerous and should be avoided at all costs. When these products come in contact with fire they may smolder and burn like a punk for several hours before bursting into flames.



A modified bitumen membrane has at least one sheet and sometimes several sheets of polyethylene, polyester or fiber glass sandwiched between bitumen layers.



A propane torch is one of the most dangerous items used in the application of RMB roofing.

Even the slightest exposure of these fiberboard products to the torch's heat poses a potential threat. I was involved in one reroofing project where a very small split in the membrane covering a gravel stop joint allowed torch flames to enter and ignite the fiberboard tapered edge strip used in the original roof. Fortunately, we were still on the roof when the fire was discovered, even though it was several hours after we had torched over the area with the RMB roofing.

Torching directly over polyurethane and polyisocyanurate roof insulations should also be avoided. The Roof Insulation Committee of the Thermal Insulation Manfacturers Association has recommended that a base ply or a layer of roof insulation acceptable to the RMB manufacturer be placed between the insulation and the RMB membrane to protect the foamed insulation from the torch's heat.

Expanded polystyrene roof insulation must also be protected from heat of any kind. Whether the RMB membrane is to be installed using hot asphalt or a torch, it is necessary to lay another type of roof insulation on top of the EPS before the RMB roofing is applied.

To handle fires should they occur, workers should keep fire extinguishers near the work area at all times. Soda acid or water extinguishers should **not** be used under any conditions because they tend to spread the fire. Foam or dry chemical extinguishers will be more effective. When using a foam-type extinguisher, workers should cover the entire burning surface with a blanket of foam. A chemical-type extinguisher should be used to apply the chemicals to the base of the fire. Before the work begins, workers should be told which type of extinguisher will be at the jobsite. They should also be trained in the proper use of the equipment.

Propane requires special care

A liquified petroleum gas (or propane) torch is one of the most dangerous items used in the application of RMB roofing. The following safety precautions should be observed whenever propane equipment is used:

- Local fire codes should be checked before proceeding. Some areas prohibit the use of propane on building roof areas. The size and type of fire extinguishers may also be dictated by fire codes in some localities.
- All equipment should be checked at least once a day for defects. This inspection should include all hoses, valves, gauges and connections.
- Burners should never be lit when the odor of propane is present. Before proceeding, the workers must locate the source of the odor and make the necessary repairs.
- Propane valves should be opened slowly and completely before the burners are lit. The flame should be adjusted by adjusting the valve.
- A flint or electronic lighter should be used to ignite the burner. Matches or disposable lighters are unsafe substitutes.
- The entire system should be examined again for leaks after the burner is lit.
- All propane containers should be securely anchored. They should also be transported, stored and used in an upright position. Propane containers that are near the burners should be protected by a heat shield.
- Propane should be used only in well-ventilated areas.
- Propane burners should never be used near stored canned materials, chemicals or explosives. Propane hoses should also be kept away from burning torches.
- A torch should never be pointed at another person. It should always be aimed at the material being applied.
- A lit torch should never be left unattended. The flame is difficult to see, and it may be difficult to hear the burner if other noise is present.
- When the burner is turned off, the valve on the propane bottle should be closed first to allow all the propane to burn out of the hoses.