



B.U.R. Throughout The Years

B.U.R. consisting of several layers of bitumen soaked felt, bonded together on site with bitumen to form a continuous waterproofing membrane on near flat roofs, was developed near the end of the last century. It has enjoyed a good reputation as an economical and desirable roofing system, and for well over 50 years it was essentially the only system. Increasing problems have been brought about by changes in building practices, that have not always been taken into account in roofing design and application. Failures have occurred because of the introduction of new structural systems, new roof deck systems, and new insulations. Some of the new insulations for instance are heat and solvent sensitive and have expanded and buckled to cause systems failures. Despite the many materials and combinations of materials in the roof system, it is usually the B.U.R. membrane that is blamed for the failure. Even considering the blatant disregard for building science to design, and careless detailing and application practices, the level of success for B.U.R. is still considered by most experts to approach 95%. Some properly designed and maintained roofs in the past have occasionally lasted for more than 50 years. B.U.R. has not changed much in a hundred years, because in general it has performed very well.

Bitumen is used in B.U.R. systems because it has good adhesive and cohesive properties, and is an excellent waterproofer when applied and kept in a continuous reasonably uniform layer. Asphalt is the most usual type of bitumen used for B.U.R. at this time. Felts are used to reinforce the asphalt and to maintain the continuity of the membrane. Organic-fibre felts have always been the principal reinforcing, but asbestos-fibre and glass-fibre felts have also been available for a number of years.

While the success of B.U.R. has always been good, the materials do have limitations that have to be taken into account if the best performance is to be achieved. Asphalt that is exposed to the weather tends to harden and become brittle, and asphalt soaked organic-fibre felt is susceptible to moisture wetting and consequent instability and deterioration. For best B.U.R. performance the gravel surfacing used to protect the top coating of asphalt and the membrane has to be adequate in amount and sizing and properly done, and the felt has to be kept from getting wet during application and in service.

B.U.R. membranes are usually very strong, but they can be split or broken by thermal effects, if inadequate attachment allows differential movement. Proper attachment of all the components in a roofing system is necessary to prevent this.

People in and out of the industry are still heard to say that asphalts and felts are not what they used to be. That is awfully hard to substantiate, however, even though materials may be somewhat different. With few exceptions, asphalts and felts today are every bit as good or better than they were 20 or 30 years ago, and B.U.R. is probably better today than it has ever been. Better materials, better designs by many more knowledgeable architects, better application by more informed roofers, and better maintenance by more caring owners often all come together to make for improved performance. There is a preoccupation at this time with the many single-ply roofing materials on the market, and this sometimes overshadows the fact that there has also been improvements and developments in roofing systems and in B.U.R.

The protected membrane system is an improvement where the waterproof membrane is placed directly on the structural deck, either loose-laid, partially attached or fully adhered, and is protected by thermal insulation placed outward from the membrane. This arrangement puts the membrane, whether it is B.U.R. or a rubber or plastic single-ply, on the warm side of the system in winter, and also protects it from thermal stress, physical abuse and the weather.

Asphalt has been modified by the addition of plastics or rubbers, and the resulting felts produced with them have much greater flexibility, and sometimes somewhat better weathering characteristics. These felts use less moisture-sensitive reinforcing of glass-fibre and polyester mats than the organic fibre reinforcing of earlier felts. They are very much heavier than earlier felts, and less plies are necessary to produce an adequate roofing membrane. Some are stuck together with asphalt, while others can be heat welded by torching, which can have advantages for some applications.

It should be pointed out that B.U.R. using wood fibre felts is still the most economical and best understood system of roofing, but the felts are being gradually replaced by alternatives such as glass fibre and polyester that are less vulnerable to moisture conditions in application and service. B.U.R. is alive and healthy, and will continue to take its place alongside successful newly developed roofing materials and systems.