

# Minimizing Roofing Expenditures

## Compromises Can Lead to Long-Term Headaches

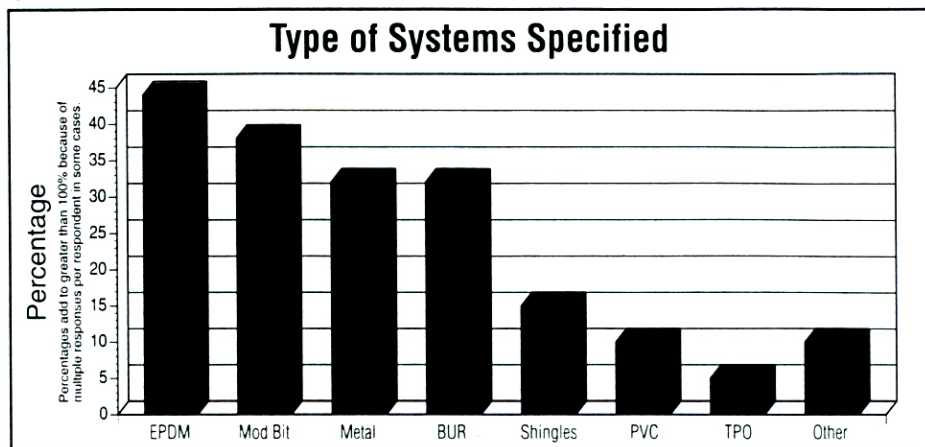
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The long-term performance of a roofing system could in many cases be predicted by the decisions made during the design phase of a school project. All too often compromises or oversights at this juncture can lead to a history of long-term headaches. More than ever, the specifier must be attuned to the finer points of the myriad of roofing systems to ensure that the highest performance system is selected while still meeting the budget expectations for the project.

Currently, a higher degree of focus is being placed on roof's effects on the energy consumption within an educational facility. A number of manufacturers have introduced products to meet the growing demand for lighter colored roofing membranes. In certain instances, a case is being made for reductions in the amount of insulation used within a roofing system. In some market segments, this approach may have some appeal as the demand for long-term performance on school projects predominates. This article analyzes the key decision drivers that impact the selection of a roofing system for the education segment, as well as the differ-



ing strategies to improve the energy efficiency of a roofing system.

### Roofing Survey

In the interest of analyzing the factors that currently drive the decision making process, a study was undertaken by Ducker Research Company. The study examined current perceptions of roofing materials as well as the decision drivers that effected their selection. The respondents who participated in the survey were involved in the selection of roofing materials for educational buildings, had completed an educational roofing project in the past 12 months and derived 25% of billings from educational (K-12) projects. The survey participants were categorized as follows: specifiers 71%, school officials/facilities managers 17%, and roofing consultants 12%.

The decision-makers were surveyed regarding their roofing systems preference. Respondents were

asked to define which roofing materials are best suited for education applications.

EPDM products were mentioned more than any other product as the best fit for roofs on education facilities. The EPDM roofing products cited are single-ply synthetic rubber membranes that have been marketed for over 30 years. Additional feedback was sought regarding the reasons for the preferences stated. EPDM was preferred as a cost-effective means to obtain a roof with the needed longevity to perform in a school environment. Other issues raised regarding EPDM included its ease of installation, aesthetics and lack of callbacks.

The survey also sought to identify those areas that are most critical to evaluate when selecting roofing materials for education facilities. Open-ended responses were solicited to identify factors that are most often considered during the evaluation process.

Clearly, decision-makers who are charged with the responsibility of selecting roofing systems are more impressed with the product's ability to perform for the long term. The focus on a strong warranty and the initial cost of the roofing system seemed to be driven by the purchasing process in the public sector. Due to issues governing the securing of funding for school projects, school decision makers had a strong preference for roofs that provided the

### Open-Ended Important Factors

	Percent of Response
Product performs to spec, durability and quality. ....	65%
Strong warranty. ....	46%
Initial and total costs for material/system. ....	37%
Track record of company and products. ....	32%
Service and support. ....	25%
Availability of experienced contractors. ....	24%



required performance at an installed cost that remained competitive on bid day.

After the roof was installed, facility managers preferred roofs that would perform without problems for the period of the warranty. Across the board, long-term warranties of 15 to 20 years were preferred for the roofs of education facilities. Funding requirements for public sector construction work may be the driver in this area since premium systems are preferred in lieu of future spending on maintenance that is derived from the operational budgets.

The responses to this survey may provide clues regarding the recent proliferation of enhanced EPDM products designed to perform in more rigorous environments. While already the system of choice for schoolwork, new variants of EPDM with dramatically improved puncture- and tear-resistance have been added. The new membranes incorporate enhanced reinforcement or fleece backings designed to resist damage to the roof system.

Since the school roof typically provides a dynamic environment, decision-makers prefer to invest in membranes that will remain problem free for the warranty period. Money invested in a thicker or reinforced membrane is money well spent since the additional amount spent stays on the roof and installation costs are virtually unaffected. Reinforced membranes as thick as 75-mils are providing the levels of puncture-resistance previously only seen with the multi-layer asphaltic systems.

## Energy Conservation

Within the Ducker survey, energy conservation was not identified as the primary decision driver in the roof selection process. The inference that can be derived is that while the issue of energy conservation is not the key decision driver, specifiers are increasingly trying to minimize the energy consumption. The low usage of the lighter colored roofing systems indicates an existing strong preference for dark colored roofs. The statistics may point to a lack of awareness of these newer systems. Alternatively, the

lack of emphasis on this issue may indicate that other solutions may provide equivalent benefits.

Insulation levels utilized on school projects frequently negate the benefits provided by the new, lighter colored membranes. In a study titled, *The Impact of Reflectivity and Emissivity of Roofs on Building Cooling and Energy*, by Lawrence Berkeley National Laboratory, the impact of roof color on energy usage was analyzed. The results of the study indicated that at a minimum insulating

value of R-11, the combined heating and cooling energy cost for the Chicago market was reduced by \$.23 per square meter by going from a black to a white roof. For Washington, DC., the savings projected was similar at \$.31 for the same minimal R-value.

Increasing the R-value from R-11 to a more typical R-19 provided a more substantial savings in the Chicago market. The energy consumed on a per square meter basis drops from \$4.62 to \$3.38 for a black

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roof, saving about a quarter of the total energy costs. Conversely, the benefit provided by the color change only lowered the energy costs by \$.08 per square meter. For the Washington DC market, savings followed the same pattern with the energy costs dropping from \$4.12 to \$2.90 for the same system.

The conclusion derived from these statistics is that increasing insulation

R-value can have a more significant impact than changing the color of the roofing system. This is especially true in northern climates where cooling days are fewer than heating days. Schools also merit unique consideration due to the low usage rate in the summer months where many facilities are unused. Clearly in such instances, the emphasis should be on achieving a cost-effective means to

save energy in winter months. Given the school segment's primary concern of product performance, the use of increased levels of insulation combined with the proven performance of EPDM is understandably a popular choice.

In southern climates, where cooling days dominate the heating days, a lighter colored membrane may in fact prove to be the more energy efficient solution. EPDM manufacturers have developed white versions of the

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product for such applications. Additionally, the new TPO thermoplastic systems also provide highly reflective options that provide performance that may in time prove to be equivalent to the EPDM systems.

## Conclusions

Roofing systems represent a critical element of any school facility so care must be taken in the selection process. A sampling of specifiers and decision-makers indicates that the focus remains on a product's ability to provide long-term performance. Products are expected to perform problem-free for periods up to 20 years.

New issues like energy conservation are increasingly being considered when decision makers select a roofing system. While not a primary decision driver, consideration should be given to a building's usage throughout the year as well as its location. Options that can be considered to reduce energy consumption vary based on the project's location and the local economics of the products to be installed. Regardless of membrane color, adequate levels of insulation must be utilized to achieve significant savings. The insulation investment provides a value that will generate savings throughout the roof's life regardless of season. 