

DuPont™ Tyvek® helps solve moisture problem in California school

CASE HISTORY



Over the past several years, moisture problems in school buildings have been reported throughout the state of California. Possibly exacerbated by the unusually wet El Niño season, many schools have experienced rot in wall structures and the presence of mold and mildew. In some cases, the growth of mold and

the discovery of toxic mold spores have forced school closings. According to Dr. Ron Feist, Superintendent, Eureka Union School District, Granite Bay, CA, "We have schools in this state dying a slow death with moisture problems. Some school districts have had to evacuate entire schools because of mold and moisture. It's a huge issue all over the state."

Dr. Feist oversaw the construction of a new \$7 million campus for the Excelsior Elementary School, completed in 1999. The campus comprises 5 buildings and includes nearly 40,000 square feet of space. The Excelsior Elementary school project is the first educational facility in the state of California to specify DuPont™ Tyvek® CommercialWrap® in its design. "In fact, we're guinea pigs on this project, said Feist. We insisted that state officials allow us to use this type of building wrap to help avoid the serious moisture problems reported in other schools."

"We insisted that state officials allow us to use DuPont™ Tyvek® CommercialWrap® to help avoid the serious moisture problems reported in other schools."



When the Excelsior project got the go-ahead, Dr. Feist began working closely with Corey Price, Inspector of Record with the California Division of State Architect (DSA). Major responsibility for the "experiment," and construction of the 5 building campus belonged to Price. "The Excelsior project has always had the moisture issue as one of the key concerns," said Price. "It's a serious problem throughout the state and this appeared to be a perfect project to take an exponential leap in solving the problem. We were looking for a way to deal with the moisture problem in the wall design, by keeping it from ever becoming a problem in the first place," explained Price.



The miracles of science™



“DuPont™ Tyvek® CommercialWrap® had never been used before and there was no provision for it in the state code,” recalled Price. “I had to request a variance from the Office of Regulation Services within the DSA who enforces the code. They were initially reluctant as the code typically called for two layers of grade D black paper. However, we were determined and volunteered as a test case to illustrate how Tyvek® could become an integral part of a new wall design to help prevent moisture infiltration and the potential problems it can create.”

“While the code called for a double layer of grade D black paper, we knew that wasn’t going to work, because it wasn’t working elsewhere. Then we considered grade B paper. It has a waterproof designation, but that lasts only a few years. In either case, the potential for moisture problems was unacceptable. The reasons for wall failures seemed pretty clear.

The code allows for the use of non-kiln dried lumber. That lumber already has a high moisture content and the presence of mold spores. It’ll dry out only to a point, but almost 20% moisture remains; spores may go dormant but not die. If any additional moisture enters the wall and the sun hits it, it immediately becomes a breeding ground for mold and mildew. The grade D paper degrades and the moisture starts to attack the exterior sheathing, saturates the batt insulation, and eventually reaches the interior walls where health and safety issues become evident. “We needed to re-think the materials we were using and the way the walls would be constructed”, said Price.

The Excelsior school buildings are wood frame on 16-inch centers with structural steel supports. Exterior walls are covered with 1/2-inch CDX plywood, wrapped with DuPont™ Tyvek® CommercialWrap®, then finished using cement plaster and a thin brick veneer. Wall cavities using R-19, batt insulation and the interior is covered with 5/8 type X drywall, covered again with 1/2-inch tackable wallboard, and finally finished with wallpaper.



“Our wall design took the basic construction and re-engineered it for moisture management,” explained Price. “First, we eliminated the grade D paper in favor of Tyvek® to provide a heavy-duty wrap around the entire building that would not allow water in, yet allow any trapped moisture to evaporate through the microscopic pores of the membrane. We added encapsulated batting for added protection against moisture saturation. If water were to enter the cavity, droplets would simply lay on the poly encapsulation for easy evaporation instead of saturating the batting and laying suspended in the glass fibers, retaining moisture and allowing mold to grow when warmed by the sun. Finally, I designed an interior wall vent system to make sure that any moisture inside the walls would have an easy path for evaporation. All wall structures require a top course of fire blocking to meet the fire code. Below the block and above the wood wall, we installed an aluminum vent that runs the entire length of every exterior wall from inside the buildings. Any moisture vapor inside the walls would then rise and escape through the venting system. As an added precaution, we sprayed all interior wall framing with a non-carcinogenic fungicide to pre-empt the growth of any mold or mildew. We then submitted plans of the wall design to

the state, and got to work on having DuPont™ Tyvek® approved to replace the grade D paper.”

“We’re confident we’ve designed a better system to manage moisture and build better schools for the future,” said Price. The DuPont™ Tyvek® CommercialWrap® will be nearly double the cost of grade D paper for this project. However, I’m about to tear apart a school that is just 2 years old with nearly 40% of its exterior wall space damaged by moisture. The estimated cost for that repair alone will reach nearly \$200,000. DuPont™ Tyvek® looks pretty cost effective to us.”

For more information about DuPont™ Tyvek® Weather Barrier Systems please call 1-800-44-TYVEK or visit us on the web at www.Construction.Tyvek.com



The miracles of science™