Technical Features − Impact Resistance
Tough Plasters Meet Abusive Challenge

ABUSE−RESEISTANT PLASTER SYSTEMS PROVIDE COMBINATIONS TO MATCH STRENGTH TO NEEDS

(Editor's Note: This article originally appeared in the 1993, Issue 1 of Form Function. Some pictures, graphics or charts may not appear in this version. Printed copies of this article, or information about the products mentioned in it, can be obtained by writing: Editor, FORM FUNCTION, 125 South Franklin Street, Chicago, IL 60606−4678.)

Especially tough materials are needed for high−abuse environments like schools, hospitals or correctional facilities. To keep abuse resistance up and maintenance down, architects and contractors are turning to high−strength plaster wall systems. Three levels of plaster systems and a variety of finish options permit architects to match abuse−resistance needs with the right combination of lath, basecoat and finish.

For instance, where high surface abrasion is the key concern, combined with good impact resistance in an economical system (Level 1), the two−coat IMPERIAL Veneer Plaster System is the ideal solution since it has the hardest finish obtainable. Where moderate to high abrasion and high impact resistance and long life are desired (Level 2), the best choice is STRUCTO−BASE/STRUCTO−GAUGE Plaster over metal lath and steel framing. And where both high surface abrasion and high impact resistance as well as security are needed, the STRUCTOCORE Security Wall System is the ultimate answer (Level 3). The following projects provide interesting examples of each of these levels of plastering.

Good Impact, Abuse−Resistant And Economical Plaster Systems

Kent College of Law, Illinois Institute of Technology "Schools like this get a lot of traffic in the corridors," said Gerald Horn, Holabird Root, Chicago, Ill., project architect. "Our first choice was conventional plaster to give us the durability we needed, but we also had to keep an eye on costs. The extra−tough veneer plaster system we selected provided the strength and feel of plaster without the added cost."

The veneer application Horn spoke of is a two−coat IMPERIAL Veneer Plaster System over 5/8−in. or 1/2−in. IMPERIAL Gypsum Base. IMPERIAL Basecoat Plaster is a high−strength plaster that offers superior surface hardness and compressive strength (3,000 psi). The basecoat is applied 1/16−in. to 3/32−in. thick over the plaster base.

The system was finished with IMPERIAL Finish Plaster, (also 3,000 psi in compressive strength). IMPERIAL Finish Plaster has the hardest finish offered by any plaster finish, providing the most abrasion resistance.

"The application was pretty normal, considering the nature of the material," said Greg Wilson, Kelly Plastering Co., Homewood, Ill., plasterer for the project. "We

normally work with plaster that’s 1−2 parts lime for workability. The IMPERIAL Finish is a pure gypsum finish, It sets very hard."

John Pappajohn Business Administration Bldg., University Of Iowa
The same system was used in an 800,000 sq. ft. installation for this project. "With 2,000 students changing classes every hour, we were concerned about durability and wearability," remarked Kevin Monson, Neumann Monson P.C., Iowa City, Iowa, architect for the project.

"We needed to have a system that would have a low−maintenance requirement and look good for years. The economy of a veneer system also was important," Monson added.

Among the considerations for this building was the detail work required. Cornices, soffits, projections and other details were incorporated to give the building the classical design required to match other architecture on campus.

"We hod worked with the system before and were pleased with the results," Monson said. "The two−coot veneer system works well in natural light. It doesn’t show every seam."

While veneer plaster provides the surface toughness required to resist many impacts and a great deal of prolonged abrasive treatment, the underlying plaster base doesn’t have the same kind of strength that is possible with conventional applications of high−strength plaster. The same thickness of a high−strength plaster applied to metal lath has far higher impact resistance than does gypsum plaster base. The 3,000 psi IMPERIAL Finish, however, provides the highest resistance to surface abrasion of any finish plaster on the market.

Improved Life−Cycle, High−Impact And Abuse−Resistant Plaster Systems
Hillenbrand Residence Hail, Purdue University At this project, great care was taken to maintain the same standards from one building to the next. "The specifications for our new building called for wood−fiber plaster, but we knew that higher strength plasters could give us superior performance," said Lanny Wilson, assistant director—residence halls.

The system selected is new and uses STRUCTO−BASE Gypsum Plaster scratch and brown coats over metal lath on steel studs. The finish coat is RED TOP Keenes Cement, lime and sand, for excellent hardness and workability, applied in a sand float finish.

"Beyond the strength and abuse−resistance factors, there are several other advantages to using this system," said Stephen Ford, Scholar Corp., West Lafayette, Ind., design architect for the project. "It provides the mass we wanted for effective soundproofing, it is easier to repair than gypsum board and it provides a quality appearance that lasts forever."

STRUCTO−BASE Gypsum Plaster is useful wherever ultimate compressive strength plaster is necessary. Used with two parts of job−added sand, it provides 2,800 psi compressive strength while maintaining excellent coverage.

Camarlilo State Hospital

A smooth−coat finish was selected over the same kind of basecoat plaster construction for this metal health care facility in Camarillo, Calif. The hospital is one of five being upgraded as part of a five−year renovation project.

"Perhaps the most important feature for us is low maintenance," said Mike Courtney of California’s Office of Project Management and Development, Sacramento, Calif. "Money for upgrades doesn’t come along too often. What we do here has to last a long time."

The plaster system used at the hospital, a mental health care facility, utilized scratch and brown coats of high−strength STRUCTO−BASE Plaster over metal lath on steel studs. The finish coat used high−strength STRUCTO−GAUGE Gauging Plaster. Applied over high−strength basecoats, such as STRUCTO−BASE or IMPERIAL Basecoat Plaster, STRUCTO−GAUGE Gauging and lime finish provides a hard, dense, smooth, conventional plaster finish.

Special care is taken to keep maintenance requirements to a minimum. Columns throughout the hospital are finished with 3/4−in. bullnose plaster corners, eliminating 90° bead corners that can dent, crack and chip.

Ultimate Security, Abuse And Abrasion−Resistant Plaster Systems
Cass County Juvenile Detention Center High−strength plaster systems stand up well under situations where walls often take a beating. But until recently, plaster systems have been avoided in high security areas. Walls in these locations are prone to being severely damaged and even knocked down making concrete the only suitable material. Now, however, today’s new plaster systems are designed to withstand that kind of abuse.

The Cass County Juvenile Detention Facility in Logansport, Ind., is a renovated elementary school that employs the STRUCTOCORE Security Wall System to partition resident cells. "Our analysis of the structure revealed that the existing floors would have difficulty handling the weight of the reinforced concrete block typically used for this kind of project," reported Dave Archbold, Schenkel Shultz, Fort Wayne, Ind., project architect. "The STRUCTOCORE System provides the strength we required with much less weight," he continued.

The STRUCTOCORE Security Wall System used for the facility is comprised of preformed, heavy−gauge, galvanized steel open−mesh forming sheets that are erected floor to ceiling and screw attached or welded. STRUCTO−BASE Gypsum Basecoat Plaster was spray applied in several coats on both sides to a minimum 3 1/2−in. wall thickness. The system is finished with IMPERIAL Finish Plaster.

Galvanized steel as the core of the system is the key to its success. Sheets are available in 18, 16, 14 and 12−ga. thicknesses, depending on the degree of protection required from ballistic threat or forced entry.

"The 3 1/2−in, wall thickness was an advantage to us," said Richard Wolf, project manager for Cass County. "Space was limited by the old classroom walls. The STRUCTOCORE system gave us about 4 in. more for every cell than would concrete blocks," Wolf went on.

Typically, the final coat of plaster for the STRUCTOCORE System is IMPERIAL

Finish Plaster, but alternative finishes can be applied. "We chose to finish the system with RED TOP Keenes Cement, lime and sand in a float finish," Wolf stated. "The finished surface provides ample abuse resistance and closely matched the finish that’s on the existing walls."

Broward County Judicial Complex
The STRUCTOCORE System is excellent for new construction as well as retrofit facilities and covers a wide range of applications from jewelry stores, high−security computer areas and currency exchanges to prisons and jails. The walls have passed tests for ballistics and forced entry standards.

At the Broward County Judicial Complex in Fort Lauderdale, Fla., the STRUCTOCORE Wall System is used to maximize security in a new criminal courts building. Areas secured by the system include holding cells and passage−ways, including elevator shaft walls.

"The thinner walls provided us an advantage in space savings—nearly 60 percent of the thickness of concrete block requirements–and saved us a lot of labor time as well," said Carlos Marciales, Michael A. Shift Assoc., Inc., Ft. Lauderdale, Fla., project designer for the building. Concrete block systems require steel rebar reinforcement and concrete−filled cells in each block.

"We also pioneered the use of the STRUCTOCORE Wall System for elevator shafts," Marciales continued. "The weight savings was a distinct advantage for the construction of our elevator shafts." Shaft walls far three elevators reach seven stories.

Application of the STRUCTO−BASE Basecoat Plaster and IMPERIAL Finish Plaster was easier to apply than expected. "We started with the most challenging area—the elevator shafts," remarked Wayne Griner, Star One Contractors, Inc., Ft. Lauderdale, Fla., the plaster contractor. "We were able to screed the material successfully in thick applications both in the elevator shafts and also on cell walls."

Never before have so many different plasters been available to meet abuse−resistance needs. Base applications range from high−strength, high−density STRUCTOCORE and STRUCTO−BASE Basecoat Plaster systems to IMPERIAL Gypsum Base. The principal finish is IMPERIAL Finish Plaster for the ultimate in abrasion resistance as well as RED TOP Keenes Cement, lime and sand blends for a durable finish where a sand float finish is desired.