Airport Surface Repair Technology

Making runway repairs at the speed of flight
Air transportation continues to serve as one of the country’s key industries. Since the first concrete pavement used for an airport in 1927 at the Ford Terminal in Dearborn, Michigan, a great deal has changed. Concrete pavement has been widely used for constructing runways, taxiways, and apron areas. Airports are busier than ever, and operating at capacity. They cannot afford to have paved areas cause gate closures or reduced landing/takeoff capacity due to maintenance and repair. Problems can occur in any number of ways; for instance, stresses may develop in airport concrete pavements such as:

- Cracking (corner, longitudinal, transverse, durability/materials related)
- Joint related (spalling, pumping, joint seal damage)
- Surface defects (scaling, pop outs, map cracking)

In these and many other challenges, unless a grout or other repair material is designed to the highest standards, it will not perform well, nor will it be durable. Every airport repair project comes with its own unique set of challenges. This is precisely why Five Star Products developed best standards and stringent quality guidelines to assure its products meet and exceed the requirements of each repair and rehabilitation project. Moreover, Five Star Products’ experienced technical team will help you understand your options, and work with you to create unique solutions to overcome any challenge you face.

Sub-standard products and poor service costs you time, money and as a contractor, can affect your future contracts. The products you use on your repair and rehabilitation work must be engineered to meet specific requirements and do so precisely. Dealing with tight schedules and tighter budgets are the name of the game.

The Five Star family of products are engineered to overcome problems in many airport surface areas.

- Runways
- Taxiways
- Parking Areas
- Beneath Parking Structures
- Heavy Cargo Vehicle Loading Areas
- Storm Water Retention Areas
- Storage Tanks
- Airport Pedestrian Tunnels
- Concrete/Asphalt Pavement
- Re-bonding cracks to handle vibration, heavy traffic, and thermal movement.

Our rapid setting products can be used to make a resilient polymer concrete. And within minutes of placement, durable, long-lasting repairs are able to handle vibration, heavy traffic, and thermal movement. They provide resistance to oil, grease, gasoline, salts and other chemicals. Five Star Products overcomes challenges anywhere on the airfield. Quality doesn’t just happen. It results from knowledge, product dedication and a proven track record. The right materials are vital for producing high quality and long lasting airfield concrete solutions. In short, quality is built into every Five Star® product.
Rapid Surface Repair PF-60

For fast acting rehabilitation and repair that’s revolutionizing roadway and surface repair. Traffic returns to normal in minutes.

Five Star® Rapid Surface Repair PF-60 is a unique, low viscosity, two-part liquid, polyurethane-hybrid polymer. When supplemented with aggregates, this product is used to repair and rehabilitate concrete and asphaltic concrete pavements. The enhanced polymer is high performance, rapid setting, and can be used to make a resilient polymer concrete. Within minutes of placement, durable, long-lasting repairs are able to handle vibration, heavy traffic, and thermal movement.

**ADVANTAGES:**
- No priming required to bond to concrete, asphalt, steel or wood
- Waterproof, chemically resistant membrane protects substrates from freeze/thaw spalling
- Stops further corrosion of reinforcing steel
- Liquid becomes solid (cures) in as little as 60 seconds. Traffic Ready in as little as 10 minutes
- No toxic fumes during application
- Low odor
- Make repairs, resurface pavements, and apply protective coating year round - hot or cold

**USES:**
- Expansion joint and bridge header reconstruction
- Control joint filler
- Repair cracks, potholes, spalls
- Resurface walkways, floors & bridge deck overlays

Rapid Surface Repair R-60

Restores concrete strength by penetrating into concrete pavements and re-bonding cracks.

Five Star® Rapid Surface Repair R-60 is an ultra-low viscosity concrete healer and penetrating crack sealer. Five Star® R-60 seals concrete to reduce freeze-thaw spalling, as well as protect from further chemical attack and is traffic ready in as little as 10 minutes.

**ADVANTAGES:**
- No priming required to bond to concrete, asphalt, steel or wood
- Penetrates, seals cracks and protects substrates from freeze/thaw spalling
- Stops further corrosion of reinforcing steel
- Solidifies in as little as 2-5 minutes, penetrating narrowest cracks
- Traffic Ready in as little as 10 minutes
- No toxic fumes during application
- Make repairs, resurface pavements, and apply protective coating year round - hot or cold

**USES:**
- Repair cracks, potholes, spalls
- Deck sealer/crack healer on PCC pavement
- Primer for epoxies and urethane resurfacers
- Creates non-skid and traction surfaces
- Anchoring adhesive
Rapid Surface Repair Easy Mix™

Within minutes of placement, durable, long-lasting repairs are able to handle vibration, heavy traffic, and thermal movement.

Five Star® Rapid Surface Repair Easy Mix is a self-leveling, low viscosity, two-part liquid polyurethane-hybrid polymer. When supplemented with its proprietary blended aggregate, this product is used to repair and rehabilitate concrete and asphaltic concrete pavements. The enhanced polymer is high performance, rapid setting, and can be used to make an impact and traffic resistant polymer concrete.

**ADVANTAGES:**
- No priming required to bond to concrete, asphalt, steel or wood
- Waterproof, chemically resistant membrane protects substrates from freeze/thaw spalling
- Use neat or with aggregate
- Stops further corrosion of reinforcing steel
- Traffic Ready in as little as 30 minutes
- Very low odor
- Make repairs year round — can be used in temperatures down to 0°F (-18°C)

**USES:**
- Runway light cans
- Expansion joint and bridge header reconstruction
- Control joint filler
- Repair cracks, potholes, spalls
- Resurface runways, walkways, floors, and parking lots

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Highway Patch

Provides resistance to oil, grease, gasoline, salts and other chemicals found in airport runways, taxiways, parking decks, ramps and bridges.

Five Star® Highway Patch is a one component, fast setting hydraulic cement material ideal for horizontal repairs of concrete in traffic areas.

**ADVANTAGES:**
- High early strength
- One component/ease of use
- Open to traffic in 2 hours
- Freeze/thaw resistance
- Resistant to salts
- Cold weather installation
- Coarse aggregate extension

**USES:**
- Airport runways and taxiways
- Highways and bridges
- Parking decks and ramps
- Expansion joint rebuild
- Dowel bar retrofit
- Cold weather repairs
Rapid Surface Repair EpoxyFix™

Fast curing, durable, long-lasting repairs able to handle vibration, heavy traffic and thermal movement.

Five Star® Rapid Surface Repair EpoxyFix™ is a unique, low viscosity, two-part liquid, epoxy-hybrid polymer. This product, when supplemented with aggregates, repairs and rehabilitates concrete and asphaltic concrete pavements. The enhanced polymer is high performance, rapid setting, has a high tolerance for moisture, and can be used to make a resilient polymer concrete.

**ADVANTAGES:**
- High moisture tolerance
- Superior bond strength
- No priming required to bond concrete, asphalt or steel
- Traffic ready in as little as 35-40 minutes at 70°F (21°C)

**USES:**
- Control joint filler
- Spall and pothole repairs
- General concrete patching where flexibility is required
- Surface repairs on roads, bridges, runways, industrial floors, parking lots
- Expansion joint and bridge header reconstruction

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Structural Concrete®

Provides increased corrosion protection of steel reinforced structures with migrating corrosion inhibitor technology and very low chloride ion permeability.

Five Star Structural Concrete® is a high early strength, single component, permanent concrete repair material. Five Star Structural Concrete® produces a repair which is dimensionally stable, develops an integral bond to existing concrete, and restores structural integrity within hours of placement. Application thickness can range from 1/4 inch to 12 inches (6 mm to 300 mm) in a single pour. Five Star Structural Concrete® provides increased corrosion protection of steel reinforced structures with migrating corrosion inhibitor technology and very low chloride ion permeability. Moisture sensitive coatings can be applied in 8 to 24 hours.

**ADVANTAGES:**
- Single component for reliability and ease of use
- Fast turnaround times with high 3-hour strengths
- Very low chloride ion permeability
- High bond strength
- Coarse aggregate extension

**USES:**
- Repair of concrete structures
- Rapid machinery foundation rebuilds
- Fast repairs for coatings
- Concrete floor repairs and overlays
- Construction joint repair
- Marine and hydraulic structure repairs
- Repair of tanks, sumps and curbs
### Structural Concrete® V/O

**Produces dimensionally stable repairs with an integral bond to existing concrete, and restores structural integrity within hours of placement.**

Five Star Structural Concrete® V/O is a high strength, rapid setting, single component, permanent concrete repair material designed for vertical and overhead structural repairs. Five Star Structural Concrete® V/O provides increased corrosion protection of steel reinforced structures with migrating corrosion inhibitor technology and very low chloride ion permeability. Moisture sensitive coatings can be applied in 8 to 24 hours.

#### ADVANTAGES:
- Can be troweled vertically or overhead
- Very low chloride ion permeability
- High 3-hour strength gains
- Can be coated in 8 to 24 hours
- One product for thin and thick placement
- Excellent freeze/thaw resistance
- Outstanding corrosion resistance for protection and rehabilitation

#### USES:
- Rapid repair of load bearing walls, ceilings and other structural members
- Rapid repairs during shutdown
- Marine and hydraulic structure repairs

### Structural Concrete® ES

**Concrete repair with extended set to facilitate deep/large volume pours up to six cubic yards in a single lift.**

Five Star Structural Concrete® ES (Extended Set) is a high early strength, single component, permanent concrete repair material which provides a 45-minute working time. Five Star Structural Concrete® ES produces a repair which is dimensionally stable, develops an integral bond to existing concrete, and restores structural integrity within hours of placement. Five Star Structural Concrete® ES provides increased corrosion protection of steel reinforced structures with migrating corrosion inhibitor technology and very low chloride ion permeability.

#### ADVANTAGES:
- 45-minute working time
- One component
- Deep, large volume pours up to six cubic yards
- High 6-hour strengths
- Coarse aggregate extension up to 80%
- Excellent freeze/thaw resistance
- Provides permanent concrete and equipment/machinery foundation repair
- Facilitates equipment rebuilds in under 24 hours
- Pumpable
- High bond strength
- Outstanding corrosion resistance for protection and rehabilitation

#### USES:
- Deep, large volume repair of concrete structures and machinery foundations
- Concrete floor toppings and overlays
- Hot weather concrete repair
- Heavy industrial repairs and retrofits
Case History

AIRPORT RUNWAYS/TAXIWAYS

JOB SITE: LAX (LOS ANGELES INT’L. AIRPORT)

DATE: 2016

MARKET ENVIRONMENT: High-Traffic Paved Surfaces

SUBSTRATE: Concrete

PRODUCT USED: Five Star® Rapid Surface Repair Easy Mix™

THE CHALLENGE

A large US international airport which handles over 650,000 takeoffs and landings yearly* was dealing with cracking, holes and loose material on a variety of taxiways, taxi lanes and other trafficked surfaces. A serious problem requiring a permanent solution. In-pavement or inset lights have specific uses and different colors to signify their purpose along runways and taxiways. Just as on runways and other surfaces, a variety of stresses affect the pavement in which the lights are installed. Stresses on runways and taxiways are imposed by dynamic impact; by static, torsional and hydraulic loads; by temperature differentials; and by abrasion and corrosion.

THE SOLUTION

Five Star Products met with the maintenance department to review the issues and determine the best repair solution. Following a thorough assessment, Five Star Products’ technical experts conducted patch tests on several taxiways by applying Five Star® Rapid Surface Repair Easy Mix™. Based on the test results, RSR Easy Mix was approved for use. RSR Easy Mix provided a permanent bond eliminating FOD (foreign object debris) which can be sucked into airplane turbines or shoot across runways. It does not require any primer— an advantage since most existing primers do not adhere well to asphalt. RSR Easy Mix worked superbly on surface areas and the in-ground lighting systems and continues to be applied as the solution for surface repair.

About Five Star® Products

Since 1955, Five Star Products, Inc. has responded to the global need for precision machinery grouting, concrete repair, corrosion prevention and waterproofing products worldwide. Our products are in use by many of the world’s most recognized names and in some of the most challenging environments in the industrial, infrastructure and marine markets.

No matter where and when you require, we can provide you with Five Star® Machinery Grouts, Structural Concrete® Repair Products, Epoxy Adhesives and Waterproofing materials. Our extensive global presence also includes project specification assistance, on-site technical service and product availability to all points globally.

The Five Star® product line includes high-performance machinery grouts, concrete repair and restoration products, including nuclear safety applications, chemical resistant coatings, waterproofing, and marine pile and column repair products. Five Star Products operates seven manufacturing facilities, all of which adhere to a strict quality control system conforming to the ISO 9001-2008 standard.

We serve a broad range of industries throughout the world, including oil and gas transmission, refinery, chemical processing, pulp and paper, mining and metals, heavy industry and infrastructure. Our dedicated engineering and research teams provide the technical expertise and creative know-how to assist you with innovative solutions to all of your grouting and concrete repair requirements.

For confidence and performance, always specify Five Star® products.

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