Airports apron repairing technology.

Constructional Structure of aprons, in the most of airports, taxi ways, and also parking zones, in conformity with standard, is made by concrete using reinforcement.

When due to damages they need repair and maintaining, usually for the partial repair, concrete mortar is used by applying new concrete structure over the old damaged one.

Difference in characteristics between new and old concrete such as shrinkage and expansions and also low adhesion between two layers, especially in thin ones, causes to we believe the damaged old concrete could not be repaired by new concrete layer properly.

Also Due to the concrete behavior against creep, strain, and under vibration or pressure stress which cause cracks , detach of mortar pieces like sand and gravel that are separated as free pieces on the aprons that cause damages to the jet engines (FOD) which is not acceptable in standard services .

. For solving the above mentioned problem, for finding an acceptable maintenance solution, the concerned organizations requested SRA Company for a R&D project to be done by the manager of SBP Co. (Mr. AHMAD ZOLGHADRI) as a researcher-scientist for a special technology, in the year of 2000.

Therefore a special research carried out by Two years period of times which could be succeeding practically.

The final result shows that it can be applied for any airport in the World with various climates such as freezing and high temperature, dry and humid which is mentioned as follows:

Stress due to Heavy loading, vibrations, and also towing of aircrafts makes damages and removes partial repairs, from the repaired and maintained structures.

In the other hand regarding to the aprons standard structures, usages of asphalt also was not acceptable. However the partial repaired by asphalt also were failed and causes critical situation.

By expending more than two years for examining and laboratory tests and results by the R&D researcher who has more than fifteen years' experience in manufacturing of polymers for concrete structures protection, he has been successful to produce some special polymer concrete to be used as a new technology for concrete repairs specially for apron airports .

Regarding to the final results of the R&D process, the actual large scale project carried out on one of the important aprons at the Tehran Mehrabad airport which was fully damaged and totally out of service by researcher in 2002 with 13000 sq.m. area.

The period of time for fulfilling of this project was only 4 months from start to finishing , which hopefully could be done successfully just on time.

Referring to verification of succeed results of impart of tap ,exploit after five years operations under heavy duty activities, the generate of results requested for patent and after acceptance by the comity of concerned organization it has been issued under the name of the inventor Researcher (Ahmad Zolghadri) at the date of March 12. 2008 in IRAN. by the registry patent No

In the pursuant of the most succeed results of the first carried out the R&D project on Thirteen thousand SQ m the other two special aprons (Ten thousand SQ m each) and also a Helicopter bond were carried out which all of them after eight to Thirteen years under service, find to be sound and qualified for fully active in safety operations condition also for jumbo jets such as Boing, 747and707.

Because of verified received success and long term stability of the mentioned projects by heavy duty services, The Maine concerned engineering organization for the maintain and repairing to a vide damaged airport aprons (SRA-Co) Owned and managed by the patentee was invited for forty thousand square meters aprons at 20015 which after 4 months of starting of the case, fifteen thousand of the project become to surrender to the project owner for using in service. And the rest aria is under construction. Which is estimated would be final on time,

Note. Estimation of capability on the mentioned technology for carry out the same projects by man powering and machineries might be each month ten thousand square meters in the acceptable situation of weather for constructional activities.

It seems to be, this short period of time is most important cases of the apron airport fields in repairing – maintaining and accommodate of the damaged structures of aprons. To be safe and sound

Said to be, in some situations, Time is gold

Technical, schedule

Regarding to the patented technology for aprons maintenance and repairs, the contractual operations are categorized and schedule as follows.

1-Cutting and removing all week damaged parts specially around of the expansion joints

2-washing the apron aria surface, by a high pressure water system for removing adsorbed slags and dirt's.

3-removing oily contaminated surface to be fine clean.

4-Removing all week and separated grits further, after washing and collection of waists.

5-surface preparation by standard for applying the first layer of polymer

6- Echo hammering or shovel test for finding hollow spots

7-marking and estimating hollow parts deepness also iron bar corrosion happenings.

8-Injection of Sarothane polymer SBP-300 for deep feeding and under cover repairing,

Note 1: The special polymer which must be used in this technology is SAROTHANE - 600&700&800&300 for three partial layers and also as the row material for producing the concrete polymer.

Note 2: The above mentioned polymer is an aromatic bonding structure, but long life resistant against UVA, UVB, also having stability agains-50.C freezing and above than 120C heat, (Freezing and heat resistance) which are manufactured by researcher and patentee as his know how.

9- Concrete polymer production must be carry out just at sight, by concrete mixer machinery units, to observe compatible volume by amount of applies within one hour time, from start of mixing to apply for each batch contents.

10-Appropriation the light concrete for low deep repairing (Up to 5 Centimeter) and heavy concrete for deep parts (up to 40 centimeter or more)

11- Using reinforcements on the wide area and deep spots.

12- Usage of concrete mortar as the constructional applies on the partial damaged structures and leveling to be in bedfellow by apron surface.

13-Usages of surface protection layers in three categories of Sarothane polymers type 600-700 and 800.

14- Usages of finishing surface protection by Sarothane polymer.

Note: While in the critical situation there are, asking necessity for rather serves operation. By usage of rapid system curing for (SBP) concrete polymer, within a few hours the maintained and repaired structures, would be ready to be used in service which in some critical situation might be so important and valuable technology.

By the above mentioned technology all various damaged aprons also heavy duties for Jumbo jets aircrafts in freezing and also hot situation are safely repair able.

Note:

This proposal is prepared for the valuable managements concerned in engineering consulting and contractors for expert activities in airport aprons, rejuvenation and

maintenance-repairs for minimizing time and expenses also highest stability against normal and heavy duty airport aprons services.

Analogize, in specifications, for normal concrete, and (SBP) polymer (concrete polymer).

1-For simulation, definition, the differences are such as Glass and Rubber.

2-Adhesion strength for SBP concrete would be so more than normal concrete

3-curing time foe SBP concrete is so shorter than the normal concrete.

4-Errosion resistivity for (SBP concrete) is so more than normal concrete.

5-Concrete polymer is anticorrosive but normal concrete is not.

6-SBP concrete is elastomer, Normal concrete is not.

7- Water absorbance in normal concrete is high but in polymer concrete is low.

8-Bending and vibration up to 30% is resist to the concrete polymer but for normal concrete is not.

9-curing possibility for polymer concrete in frizzing, lower than -10C and heating up to 80C is possible but for normal concrete is not.

10-In the critical situation finishing repaired within 2 hours by (SBP) polymer concrete is available, but by normal concrete is impossible.

Note: fourteen years' experience in heavy duty services operations which is sound and safe shows that by this technology we can rich to a long life and safety repairing structures on the airport aprons by saving time and money.

Note: The above mention technology is warranted by the patentee.(Ahmad Zolghadri CEO for SBP CO, Sarouge Bon Pey Co) Iran