Repair Scheme for Rear Fuselage of Kiran Aircraft

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Abstract - Hindustan Aeronautics Limited is the one of leading aircraft manufacturer in the world. One of the aircraft manufactured in the Hindustan Aeronautics Limited is Kiran Aircraft. During the pre survey of the aircraft the crack is found in rear fuselage which is to be sealed. This paper presents how the crack in the Rear fuselage has to be removed. In olden method the entire skin has to be changed which increases the entire cost of production. So by doing the flush patch in the rear fuselage the entire production cost of the aircraft can be reduced.

Keywords: Flush patch plates, rivets.

1. 1PROBLEM IDENTIFICATION:

During the pre survey of Kiran Aircraft the crack is found in the rear fuselage of stations no: 4 to 12 which must be sealed

2. LITERATURE REVIEW

Design of Durable, Repairable, and

Maintainable Aircraft Composites: Advanced composites have found increasing application in commercial aircraft structures as a result of the strength, stiffness, fatigue, corrosion, and weight benefits afforded to improve performance. Safety and functionality are high priorities for integrating composite components into commercial aircraft structures.

Joining and Repair of Aircraft Composite Structures: In this paper, a methodology to reduce composite structure maintenance operational cost using SHM system is addressed. Based on SHM real- time data, in service structure life time prognostic and remaining usefull lifetime (RUL) can be performed. Maintenance timetable can be therefore predicted by optimizing inspection times. Probabilistic approach is combined with phenomenological fatigue damage models for composite materials to perform maintenance cost effectiveness of composite structure.

3. MATERIAL REMOVAL PROCESS

The material is removed by chain drilling process.**CHAIN DRILLING PROCESS**:Drilling is a cutting process that uses a drill bit to cut a holes of circular cross section in solid materials. The circular bit is usually a rotary cutting tool, often multipoint. The bit is pressed against the work piece and rotated at rates from
100 to 1000 of revolutions per minute. This force is the cutting edge against the workpiece, cutting off chips(swraf) from the hole as it is drilled

4. REPAIR SCHEME FOR REAR FUSELAGE:PROCEDURE OF REPAIR SCHEME TO SKIN AND STRINGER

Remove surface finish.Cut the damaged skin portion of skin and smooth the contour.Deburr the cut edges.Make the patch plate of same material and gauge of damaged skin.Fit the plate, drill the holes in position.Fit patch and rivet in position

HEAT TREATMENT OF RIVETS :

The rivets shall be degreased and cleaned.Put the rivet in the perforate rivet container with lid.Put the container in the furnace.Set the temperature of furnace at 500^0C .Solutionizing is done for 30 minutes.Set temperature after loading the rivets into the furnace.After the completion of set time, remove the rivet containers from the furnace and quenched by immersing in the water at the temperature of 20^0C to 40^0C.The quench delay between removal from the furnace and the complete immersion should be maximum 10 seconds.Keep the rivet container in quench tank until it attain the same temperature as that of water.Remove the container and drain fully,Dry rivets and use it within 2 hours.

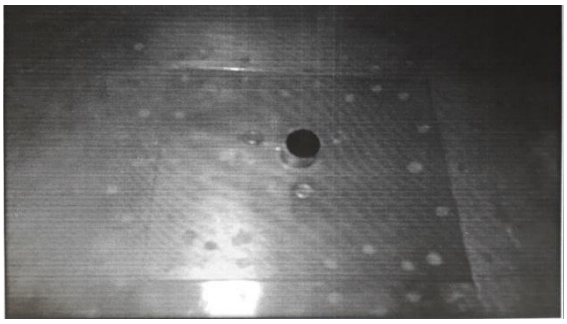
5. RIVETING PROCEDURE:

Use slow action gun it is easier to control.Adjust the air pressure sufficiently to drive the rivet into two or three seconds.Use your body weight to hold the rivet gun and set firmly against the rivet.Hold the gun barrel at 90^0 to the material.Squeeze the trigger by gripping it with your entire hand, be sure that bucking bar is o the rivet.Operate he rivet hand with one head, handle rivets with your other hand.Plan a sequence for riveting the assembly.Drive the rivets to the rhythem.

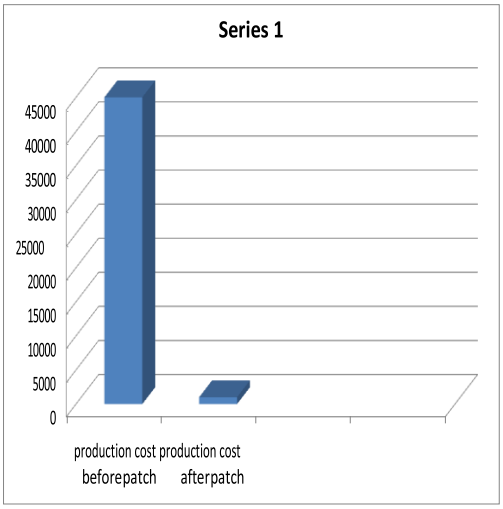
PROCEDURE FOR INSTALLATION

Remove the surface finish.Mark the suitable outline with regular shape to encompass damaged area.Cut the damaged area into smooth profile(as per outline marked).Deburr the cut edges.Mark patch and patch plate from material of same gauge and specification as that of damaged skin.Clean skin patch and patch plate with methylethylketone and dry with lint free cloth.Position patch plate, mark the rivet holes and rivet using the same type of rivet used in the area.Position patch, drill rivet holes and rivet.Restore surface finish.

PHOTGRAPHY



COST COMPARISON



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