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If It's Made of Metal, We'll Fix It

Although it may not appear to many, the repair of metal aircraft parts is a very important job. Usually any metal part may be repaired and made as strong or stronger than the original part with the addition of only a small amount of weight. When repairing a part several requirements are to be met. The strength of the original part must be maintained, the outside shape must be conserved, excessive weight must not be added and corrosion resistance of the repair must be observed. There are many different repairs made including patches, dents, replacement of rivets and repairs to struts, ribs, skin surfaces, stringers, etc.

The first step in a repair is, of course, to determine the extent of damage and to prepare the part for repair. Jagged edges, corroded and damaged parts have to be cut away and cracks have to be "stopped" by means of small holes drilled at the ends of the cracks. Rivets that are suspected of having been strained or damaged are removed and replaced by new ones.

Next comes the preparation of the material for the repair. As most of the material used in aircraft parts is of aluminum alloys, great care must be taken. The material must not be scratched either in layout or working as each scratch may possibly soon mean a crack. The proper material and gauge of material must be used in order to have the proper strength and tightness. If the material for the repair is to be formed in any way it first has to be heat treated to soften it, or it will crack when rolling or bending. This operation is carried out the same way that the rivets are softened which

is explained later. After it has been softened and formed to the proper shape by means of rolling, bending or bumping it is then ready for rivetting. Quite often it is found necessary to make complete new parts such as ribs, struts, and stiffeners as they may be damaged beyond repair.

Probably the most important part of the job is now at hand, namely rivetting. Rivetting is an art itself and can either make or break a job. The correct size and type of rivets is an important choice. Many different types of rivets are made, each for a special purpose. Of course the holes for the rivets must be the correct size, and the rivets must be the correct length. If the holes for the rivets are too large or small, the rivets too long or short, or the rivets are damaged in any way while rivetting, then the rivet heads may pull off or crack or the plate may tear. Great care must also be taken not to damage the surface of the sheet.

Before the rivets are used a heat treatment must be carried out. To do this we heat the rivets in an electric furnace at 930° F., for ten to thirty minutes depending of course on the thickness of the rivets. They are then taken out of the furnace and quenched in cold water. After quenching, the rivets are soft, but start age-hardening immediately, obtaining their maximum hardness in about four days. It is necessary to use them within an hour as they become quite hard in this time. Therefore when rivetting, it can be seen that it is necessary to work both quickly and efficiently or re-treatment of the rivets will be necessary.

MacDONALD, D. A., CPL.

**EVOLUTION OF
METAL AIRCRAFT**

Since the inception of the heavier than air aircraft, the desirability of the Metal Airplane structure has been uppermost in the minds of the Aeronautical Engineer.

The benefits of metal structures are obvious. Wood at its best is a material of variable properties. Metal on the other hand being a manufactured material can have its properties determined within a close limit.

To offset the weakness of wood a larger margin of safety must be employed and this gives excess material with excess over-weight. Moisture absorption and the dependence on glued joints puts its use very much in the background. Metal lends itself easily to production methods, the accuracy of stress analysis and the ease of replacing parts. The durability and high fatigue strength has made the metal structure very appealing to the Engineer.

The first successful Metal Aircraft was produced by Blackburn Aircraft Ltd., England. It was a monoplane, wire braced, using wings of metal skeleton, covered with high tensile strip steel all riveted together. The fuselage was wooden frame covered with the same material.

The German Government was the first to develop and manufacture aluminum light alloys and the welded steel tubing for fuselage construction.

The all metal aircraft structures were slow in developing through the lack of suitable alloys, technique of heat treating, fabrication, inexperience and cost. Fabrication on an all metal plane is costly and metal working requires skilled labour.

The all metal aircraft is the ideal ship for military use. Repairs can be more quickly done and the all metal job will stand considerably more abuse in handling than the wooden and fabric constructed aircraft.

CPL. HUDGIN, I. G.

**"BURNS FROM
THE WELDERS"**

Fire is our business, yet we are not firemen! We make use of a controlled and directed flame of terrific intensity to join similar or dissimilar metals in the repair and construction of everything in metal used in the airforce.

Ordinary mild steel is the metal most commonly welded, yet one of the hardest metals to weld correctly, because many welders do not bother to keep their flame correctly adjusted. Slight variation in the gauges that regulate the flow of gasses or a spark adhering to the end of the tip will cause an oxidizing flame which burns the metal and weakens the union.

In some cases, the trick we use to join new metal is next to useless on old or burned metal, as is the case with stainless steel. With the new metal we use a neutral flame and a flux to make a union, but with badly burned metal we find a soft carburizing flame and no flux the best.

Not all metals are joined by welding, for welding in some cases, changes the original structure of the metal. In other cases, in joining dissimilar metals the melting points are so different that to flow the two together would burn the metal with the lowest melting point. In cases like this we braze, silver solder, or soft solder, depending on the metals concerned in the union.

One way you can help us when you bring in your jobs to be welded is to make sure that they are clean; if this is done it will save time and we can make a far better job.

L.A.C. HARPER, H.C.

ISN'T THAT RIGHT?

New definition of golf: A game in which you place a ball an inch and a half in diameter on a ball 8,000 miles in diameter. Then you try to hit the small ball without hitting the big one.

Answers.

Read It Or Not

By CPL. TED RORKE



With this issue of Wings Over Borden your old columnist folds his tent and silently (?) steals away. My association with the station paper for the past two years has been indeed a pleasant one, many an otherwise useless hour has been filled with interesting "headaches". Looking back through the old file I see it was about twenty-two months ago that the Editorship fell into my lap with the posting of Cpl. Bill McIntyre to Toronto.

At that time I was a rather unwilling candidate for the position, for my workaday tasks were heavy, and my association with the former Editor had taught me that the job demanded much personal time, that your neck was stuck out most of the time, and that you were under fire constantly from all branches of the personnel. A few months on my own, I discovered that Cpl. McIntyre had not exaggerated nor had he minimized the setup. However, forgetting these things it has been a pleasant task to watch the paper grow and develop into a magazine, and it is my personal hope that it will grow still better and bigger.

Before I join the ranks of the unemployed entirely, I want to say a word of appreciation to those who during the past months have given me their loyal assistance. To Squadron Leader McCulloch, F/L Shortreed, John Bampfield, Cpl. Tom McKay and all the sub-editors a million thanks. I would like to also make reference to the loyal support of 'Dad' Parker, who is always first with his copy. Thanks are also due to the Photo Section who to a man have done all in their power to assist in the publication of Wings Over Borden. Another man who rates a big bunch of orchids is a merry-faced little Irishman of the Electrical Maintenance Section, Cpl. M. J. Hanlon. Mike has been a close pal of mine ever since I came on the Station, and he has been doing a super-terrific job in pounding the pavements of Barrie soliciting advertising for the magazine and collecting for same. Last but not least in the thank you chart is Ken Walls and the staff of the Barrie Examiner. They are the unsung heroes of W.O.B.

To those who haven't supported the paper to date, get in there and start punching. Remember anything you write will be just as interesting as what the other fellow writes, both to him and you and the folks back home.

This column sounds more like an obituary than anything else so far—but it's not intended to be one. There are a few that think that new blood would be a good thing for Wings Over Borden and I am among them. So to the new Editor, whoever he or she may be, the best of luck and success!

Before closing I want to contribute my last little bit of corn to this column. And is it ever corny, dear cornfed readers.

It seems in one of the occupied countries an investigator was questioning three poultry farmers.

Investigator: What do you feed your chickens?
1st Farmer: I feed 'em corn.
Investigator: You are under arrest! Corn is a food product. What do you feed your chickens?
2nd Farmer: (trying to be cagey) I feed mine corn husks.
Investigator: We use corn husks for the manufacture of cloth. You are under arrest. Turning to his third intended



victim he asked: What do you feed your chickens?
3rd Farmer: Oh, I just give them the money and let them buy what they want.
If there is room I will end with the first contribution I made to Wings Over Borden way back when.

A.C. JOE
(With apologies to Rudyard Kipling's Gunga Din)

You may think you're overworked,
When those duties you have shirked,
Have piled up and left you far behind.
When headquarters calls for action,
And your brains ain't got no traction,
And there's just no solution you can find.
Don't let the powers know it,
Look around and you can 'joe' it
To the man in every squadron we all know.
He is just a young beginner,
In a pinch he'll be a winner,
He's the R.C.A.F. hero A.C. Joe.

It's Joe, Joe, Joe,
Where the devil did you go?
But you're willing and forgiving
By the saints all dead or living,
You're a better man than I am A.C. Joe!

When Adolphie's through his blitzing,
And Benito stops kibitzing,
And Hirohito has been struck a final blow,
There'll be shouts of joy a-ringing
And all tongues your praises singing,
For the part you played in winning, A.C. Joe.
When the aces and the bosses
Get their V.C.'s and George Crosses,
We'll see you get the D.S.O.
For you work in cold or heat,
And you're mighty hard to beat,
For you and us there's no defeat,
A.C. Joe.
It's Joe! Joe! Joe!
Where the devil did you go?
Off to lick the blooming Heine,
Britain still rules sky and briny,
God go with you till the fini,
A.C. Joe.

GOOD BYE NOW!

EDENVALE

Edenvale so far remote,
Envy us—we know you don't,
But we have pleasures—although rare,
With which Borden can't compare.
Open spaces—just galore,
Quiet evenings by the score,
A bit of mud, a bit of sand,
Which adds the beauty to our land.
Of show and theatre we cannot boast,
But what we treasure at the most
No weary miles to trudge and shirk
To the hangars to go to work.
On a Sunday with a clear blue sky
With Harvard roaring 'way up high,
Students flying the work is done
As R1 Edenvale carries on.

—AC.1 HARMAN, M.

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