MESH SYSTEM FOR SAFER FLIGHT

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Abstract — Number of birds hitting planes doubles to 2200. As due to increase in the deforestation and less plantations in cities, pollution has led to some critical circumstances. The areas of cities are unsafe and have a lot of traffic which resulted in the movement of birds toward the open place and most of the time they are near to either shipyard or airport. These birds create a lot of problems for their self and sometimes it could be fatal. Due to technical advancement and recent development the air traffic has drastically increased. now the worst case happens due to the bird that are there near airport they generally fly in the vicinity of airport, so whenever the flight is taking off or landing and if at that time is any bird or group of bird come in way of plane and generally toward the engine then they get sucked which may result in engine failure or accident. Now in order to minimize this problem we came up with our very own innovative idea of using a "Mesh System For Safer Flight". In this consideration for example if the plane is taking off then if the bird hits the engine/approaches toward the engine, so in order to minimize this problem we will be using a mesh system that would be more or less like an honeycomb. When the birds would strike the engine then the bird will not get into the engine rather instead it will strike on honeycomb like structure. This will help a lot in reducing the accident that is happening now a day.

Keywords — Bird Hit, Honeycomb, Mesh.

I. INTRODUCTION

As per the current scenario the number of people taking flights for travelling from one place to another is increasing day by day, not only in developed nation but also In developing nations also, the rise in the number of passenger is ever increasing And at the same time the safety of people is also a big concern. There are a lot of factor which contribute toward the unsafe flight, it may be due avionics failure, it may be due to problem associated with the runway and above all the thing that is not in our hand right now is the bird hitting. This leads to various problems that occurs during the time of take-off and may lead to major or minor accidents. So inorder to minimise the problem we came up with theinnovative idea of using an advanced system inspired by nature.

Basically it is an idea to change the world of aviation. It is to introduce the safest flight experience. The main aim is to reduce the number of accidents

This is an idea of using meshing system in front of turbo fan engine in commercial airlines. The system would be such that, it would be having a honeycomb like structure which will allow the air to pass steadily through the holes and will serve our main purpose also. The honeycomb type mesh will help us in such a way that it will stop the birds and foreign object to enter in to engine.

II. CURRENT PROBLEMS

1. A turbofan engine is mixture of turboprop and turbojet engine. Even after success of turbofan engine still there and sum problems occurred during flight.

- The major problem faced is the bird hitting which cause danger to passenger'

2. Unsteady flow of air in the inlet that affects the efficiency of inlet and later affects overall performance of engine. Due to unsteady flow unnecessary pressure gradients are created in the inlet that reduces efficiency of inlet as it needs to suck maximum amount of air for engine.

3. Stall problem occurs due to unsteady flow, stall may also occur in the compressor and engine may fail. Also the turbulence is created in the engine when the aircraft enters dense cloud region which also creates vibrations and affects engines overall performance.



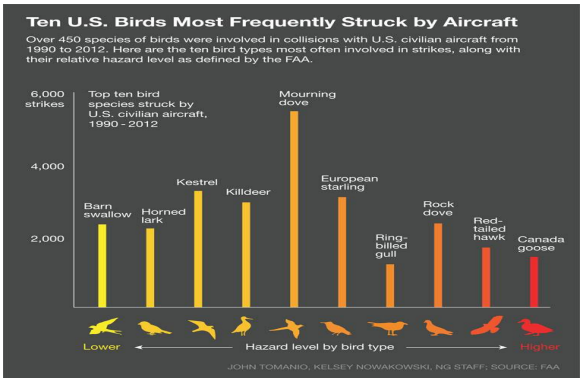
Compressor blade damaged.

4. Foreign objects specially birds that may enter the inlet and destroy the entire engine sometimes. It can also break the propeller blade. Foreign objects can be anything and hence it affects overall efficiency of the engine.

5. Fuel Consumption in aircraft engine is also affected .At lower altitude density of air is high as density is directly proportional to mass and

inversely proportional to altitude. So more fuel is consumed to maintain the flight cruising or during take-off.

6. As it could be inferred from the graph given below there is never-declining rise In bird hit .



A Typical graph showing number of accidents

III. WORKING

As per current scenario there is a lot of problem due to bird hitting we are facing. A lot of major and minor accidents have taken place.

To reduce all these problems and to have safer flight a circular mesh can be put at the inlet of the engine in which its mesh element is of circular shape. The mesh will be like a honey comb structure.

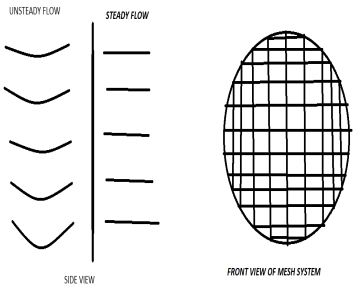


FIG 1.1

A basic inference could be taken from fig 1.1.

As per the figure 1.1, the working would be, when the air flow is there it get steady after getting passed by through the mesh which is like honey comb.

This kind of structure is also in wind tunnel used to maintain steady flow. This mesh will be used to maintain steady flow in the engine. Due to steady flow we easily can prevent stall problem in the engine. Due to mesh structure at the inlet of the engine will be protected from foreign materials that may enter the engine specially birds. If we construct a variable area mesh at the inlet we can reduce the mass flow rate of air at lower altitude and low fuel can be used to propel aircraft, and most important factor of safety would be high.



Honeycomb Structure

Since the number of bird hitting is not going to be less but the damage would be reduced.

The area of the each mesh is going to be small enough so that no bird could enter in to the engine. The area of mesh would be enough for to pass through without any problem.

The arrangement would be such that a mesh would be mechanically fitted in front of turbofan blade, the mesh would be tightly tightened with the outer casing so that it doesn't get inward due to high pressure, and moreover the material used will of good quality.

A basic analysis has been done by using CATIA software in which certain amount of load has been applied and the mesh has been diagrammatically shown

The material used will metal and composite such as titanium mesh, carbon rods mesh, nickel alloy etc.

IV. APPLICATIONS

1. This could find a lot of application. First and foremost in case of the turbofan engines.
2. This could also be used in turbojet engine.
3. This mechanism will enhance overall efficiency of the engine by providing steady flow of air.

CONCLUSION

As per the current scenario there a lot of problem associated with flight hence this would be a great innovation.

This would allow the aeroplanes to fly without any hindrance any hassle free take-off.

This will increase the factor of safety of the flight and passenger would be safer and the fuel efficiency would also increase compare to previous version.

Moreover the stall could be prevented as in this case there would be steady air flow.

REFERENCES

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