Supersonic Passenger Aircraft Costs Noise and Environmental Challenges

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Supersonic Aircraft are planes that are made to transport passengers at a speed that is greater than that of sound. They move at a speed that is three times faster than the regular planes, and they can replace three regular planes that are in use. A supersonic aeroplane was first flown by NASA in 1978, and it ceased in 1998 since it had no partner to proceed with the project. The only supersonic plane that has ever been used by airlines to transport passengers is Concorde. Concorde was in operation last on 26th November 2003. Supersonic aircraft have never operated since the cessation of Concorde since some individuals argue that supersonic aircraft are too expensive. However, this is not the case since some countries, such as Japan, have embarked on building a commercial supersonic aeroplane with a capacity of 300 passengers (National Research Council, 1994).

Boeing, a commercial aeroplane industry, has come up with research showing that supersonic aircraft can be the most economical and quiet plane. This is because they can be used instead of many planes leading to fewer workers and a lower maintenance cost. In addition, the Concord airplane had proved profitable to Britain airlines over the years that is was in operation whereby it used an approximate amount of one billion pounds with revenues of 1.75 billion pounds over 28 years. However, this has proved impossible because in building a supersonic aircraft, for any required amount of lift, the plane will have to supply twice the thrust of a subsonic aircraft leading to the use of more fuel (Abu-Taieh et al., 2012).

Despite all these arguments that have been brought forth concerning the use of supersonic aircraft, other human factors also contribute as follows.

1. High Costs

For a supersonic aeroplane to be built, it needs a lot of resources for it to reach completion and start operating. For instance, a huge compressor and turbine wheels are required to make it function properly. Besides, after building the plane and putting it in operation, it will use a lot of fuel to transport fewer passengers. This is because supersonic planes need a double thrust to lift compared to their counterpart subsonic planes. If supersonic aircraft are to be put in operation, they will drain the economy due to the expensive nature of building and operating them (Abu-Taieh et al., 2012).

2. Loud Take-Off Noise

Supersonic planes have a very loud take-off noise, as Concorde witnessed. This noise originates from the plane engines due to the extremely high velocities, and it affects the communities over which it flies while taking off. The loud noise can affect the eardrums and lead to medical disorders. Furthermore, it affects communication among the people around the take-off point (United States, 1994).

3. Skin Temperature

When supersonic jets move, they compress the air in front of it. As the air gets compressed, it is heated up and it in turn heats up the aluminium material used to make the aircraft. This makes the plane hot and, therefore, unfavourable for human use. Contact with the aluminium material may lead to burns, which is dangerous to the passengers (Abu-Taieh et al., 2012).

4. Sonic Boom

This is the booming that is produced by a supersonic aircraft as it approaches the supersonic speed. This sends shock waves to the earth, leading to a tremble. Frequent sonic booms may lead to earth movements that can cause destruction of property and loss of lives (United States, 1994).

5. Destruction Of The Ozone Layer

The engines of supersonic aircraft release exhaust fumes such as nitrogen oxides, which may damage the ozone layer. During Concorde's operation, Russell Train said that if a large number of supersonic planes were allowed to take flights over a prolonged period of time, they could hamper the formation of the ozone layer. This is because of the ground-level heat that shall have accumulated as a result of air compression. The destruction of the ozone layer can lead to global warming, which will have adverse effects on life. Besides, it will lead to the penetration of ultra-violet rays that will not only destroy plant life but as well cause cancers to humanity (In Chuck, 2016).

In the year 1971, the US Congress stopped funding the United States Supersonic Transport program and banned all supersonic flights due to the ozone layer threat that was being posed. Train said that continual supersonic flights could lead to high ground-level heat that could prevent the formation of the ozone layer. Later on in the years, a danger was posed by the ozone layer destruction through the Nitrogen Oxides that were released from engine fumes. This led to a critical observation of the ozone layer in order to make comparison between the past years and the then current ozone layer (United States, 1994).

Although challenges have been experienced in the establishment of supersonic aircraft, they can be solved to ensure its success and continuity. First, supersonic aircraft should be built with a higher passenger-carrying capacity. This will lower the costs since the higher passenger capacity will cater for the extra fuel used. In this manner, the plane will be able to incur lesser costs and higher revenues for the responsible airline. This will not only cut down on costs but also increase the income of the citizens (Abu-Taieh et al., 2012).

Secondly, the supersonic jets should be designed in a way that the engines will have variable cycles with low velocity at take-off. This will help reduce the noise made by the engine when the plane is taking off (United States, 1994).

Also, the sonic boom can be avoided by maintaining the speed of the aircraft at a normal pace at lower altitudes and then accelerating the speed to a supersonic rate after the aircraft has sufficiently reached a high altitude. This will prevent the shock waves from reaching the earth and causing destruction (United States, 1994).

The increase in skin temperature can be handled by building the planes using a better coating material which can resist adverse temperatures. The manufacturers can use materials such as Carbide ceramic to coat the aluminium materials that are used in the building process (Abu-Taieh et al., 2012).

Supersonic aircraft are most preferred by airlines because they move at a very fast speed, and hence, they make more flights in a day and, therefore, more returns. Faster aircrafts also save on time and cut down on maintenance costs and required personnel. It is, therefore, prudent that supersonic-speed aircraft be reintroduced into the aviation field so as to help increase the gross domestic product of the country and provide better living standards to the citizens. Curbing the challenges and implementing this technology shall enable the world to move to a higher level and promote higher fields of research in aviation. It will improve transport and communication among nations in the world and bring cohesion and unity. In return, trade affairs will improve among nations and the economy will be made better (Abu-Taieh et al., 2012).

The United States of America recently allocated a fund to NASA for experimenting on a supersonic aircraft that could be used in transporting people faster than the subsonic planes. That 2021 forecast did not occur. NASA’s X-59 quiet supersonic research aircraft completed its first flight on October 28, 2025, and first flew faster than sound on June 5, 2026; it remains an experimental research aircraft rather than a passenger airliner. This will create more job opportunities and reduce the time used to travel across countries by half. The aim of funding NASA is to build supersonic planes that are quieter with a lesser sonic boom and we hope that this shall surely be achieved in the near future.

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