

Overview of C2D

C2D Solutions Pte Ltd is a holistic knowledge-based engineering solutions provider with a wealth of experience. We are committed to deliver the most optimal solution based on sound engineering principles.

Problem Statement

The doors of an existing aircraft maintenance hangar has to kept open during spray painting operations in order to ensure health and safety of workers. The ingress of wind and contaminants through the open doors have resulted in poor paint works and paint wastage.

Challenge

The aircraft hangar doors are kept open to ensure that the workers are not exposed to high levels of pollutants during spray painting operations. Ingress of contaminants into the hangar during the painting process produces a poor paint finish. Furthermore, the wind coming from the open hangar doors disperses the paint mist and causes a lot of paint wastage.

Solution

To ensure good paint quality, the hangar door must be closed. The use of specialized conical air diffusers and extraction units was proposed by the client. However, the proper placement and flow rates of the conical diffusers relative to each aircraft type (B777, B747, A320) is important to ensure a controlled and safe condition during painting. Computational Fluid Dynamics (CFD) was used to simulate various configurations before recommending the most optimal operation to the client.

Results

By using CFD to analyse the proposed mechanical ventilation design, adjustments were made to optimize the design to provide ideal environment for aircraft spray painting operations. From the optimized CFD results (Fig. 2 & Fig. 3), it shows that the air flows smoothly from the supply (conical displacement units) to the aircraft surface and extraction units.

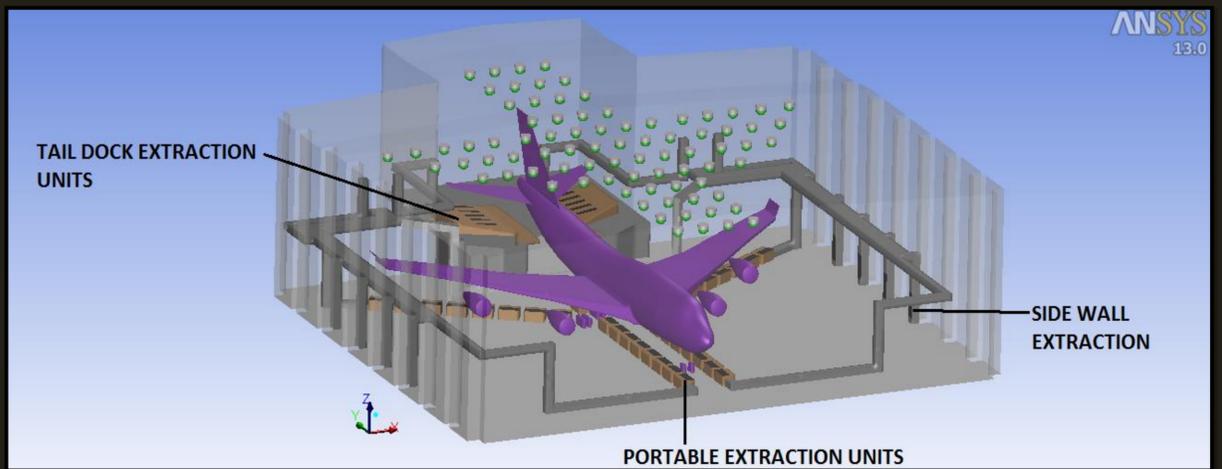


Fig 1: Computational Domain of Hangar (Boeing 747-400)

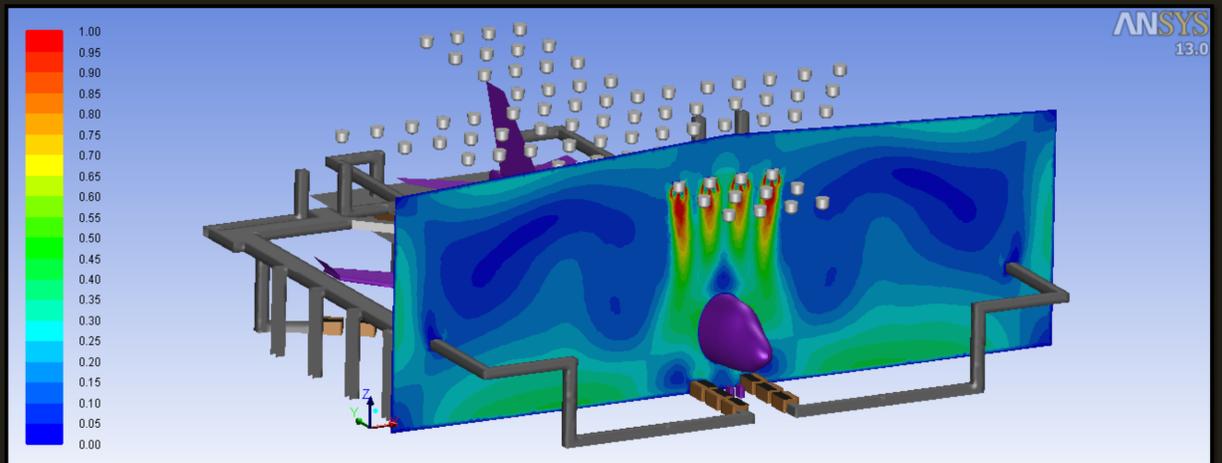


Fig. 2: Velocity Contour on Plane Surface

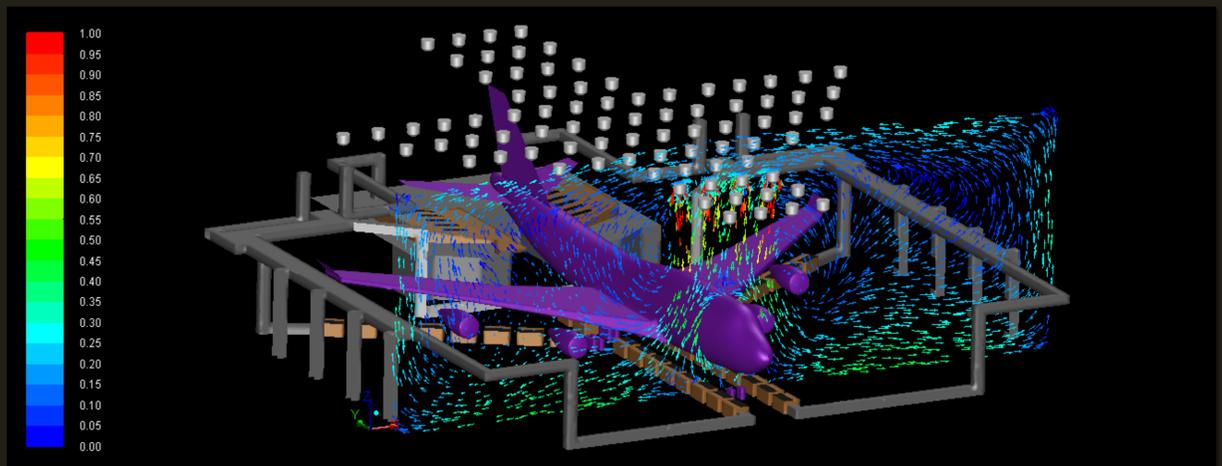


Fig. 3: Velocity Vector on Plane Surface