



CASE STUDY /

## **Ansys + MoJet Ventilation**

“Simulation plays a huge role in our processes, allowing us to test a wide range of environments and address industry challenges. As an innovative organization, we require innovative partners and solutions, and our close partners Ansys deliver this every day.”

**Dr Fathi Tarada**

Chief Technologist / MoJet Ventilation

# MoJet Ventilation Uses Ansys Simulation to Enhance Jet Fan Performance and Accelerate Efficient Urban Sustainability Practices

MoJet Ventilation is a leader in tunnel ventilation innovation, providing the next generation of jet fans in a variety of projects worldwide, from road tunnels to metro and rail tunnels. The company has reinvented the traditional jet fan used in tunnel ventilation systems by developing the MoJet®, an energy efficient tunnel ventilation system that increases aerodynamic thrust needed to ventilate tunnels while keeping power and energy consumption low.

## / Challenges

Jet fans installed in the confined space of a tunnel pose a unique design challenge: safety requirements in case of fire (including smoke control) and maintaining acceptable air quality and visibility during normal operations. The closer the fan is to the tunnel soffit (roof) and walls the better; however, such placements lead to greater aerodynamic friction on the discharge side and choking of the inlet flow, which negatively impacts jet fan performance.

## / Engineering Solution

Using Ansys CFD tools, Ansys CFX and Ansys Fluent, MoJet Ventilation can simulate the performance of the MoJet® both in the factory during bench thrust tests, which are crucial steps for factory certification, and when installed in the actual tunnel environment. The airflow modeling capability within Ansys CFD tools means that MoJet Ventilation is able to test the entire flow domain, including the tunnel and the rotating blades mounted on the rotor, to ensure that each MoJet® is suitable for the specific job requirements.

With simulation, MoJet Ventilation can test engineering challenges and environments that were previously difficult to achieve.

## / Ansys Products Used

- Ansys Fluent
- Ansys CFX

## / Benefits

- By using Ansys CFX and Ansys Fluent, MoJet Ventilation markedly decreases the number of MoJet® prototypes, as well as the need for full-scale testing.
- The diverse range of tunnels worldwide makes it difficult to accurately test the MoJet®. With Ansys CFD, MoJet Ventilation has the confidence to simulate tunnel environments with excellent accuracy, while also testing how the air flow from the jet fan reacts in different scenarios.
- With the help of the Ansys CFX and Ansys Fluent, the MoJet® delivers up to 100% more thrust than other jet fans by reducing friction and improving airflow away from the soffit and walls.
- MoJets® are more energy efficient than competitors, reducing energy consumption by up to 50%.

*“Our extensive research and testing at TLT-Turbo has confirmed the significant advantages of the MoJet compared to conventional jet fans. We are very excited with the MoJet and look forward to take tunnel ventilation to the next step”*

Lars Lehmann, Product Manager Tunnel and Metro, TLT-Turbo GmbH.

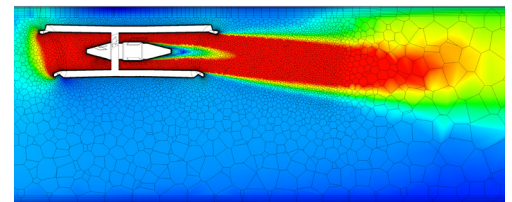


Figure 1: Fluent Fine Mesh Jet



Figure 2: MoJet Installation



Figure 3: MoJet Bench Thrust

## / Company Description

MoJet Ventilation provides innovative, leading tunnel ventilation systems to major infrastructure projects, striving to be as sustainable and cost-effective as possible. MoJet Ventilation's experienced team of engineers and innovators are constantly enhancing, innovating and challenging the older model of tunnel ventilation. As cities seek to lower emissions, tunnel ventilation will play a huge role, and MoJet Ventilation aims to lead the way in helping to reduce emissions, while keeping costs low for contractors, tunnel owners and operators.



Figure 4: MoJet Side View

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