

Ground Run-up Enclosures for Commercial,
General Aviation & Military Aircraft

GRE



BDI
Blast Deflectors

Reducing Airport Noise and
Improving Safety Since 1957

“BDI’s extensive knowledge of acoustics and aerodynamics, along with an extraordinary commitment during the design and construction phases, were critical factors in the overall success of the project.” - Airbus Group

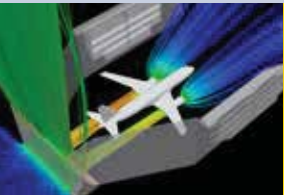
Martin Tzschichhold | Project Manager

BDI pioneered a cost-effective, technologically-advanced solution for ground run-up noise attenuation. We offer ground run-up enclosure (GRE) facilities that use patented components, proven designs and a spotless track record of successful installations. BDI’s philosophy is to balance project requirements with practical solutions.



Planning & Design Support

- Ground run-up noise assessments
- Photorealistic renderings for communicating concepts to stakeholders
- Support for FAA Part 150 studies, airspace studies, obstacle free conflicts, aerodynamic usability, etc.



Engineering

- Continuous innovation using computational fluid dynamics (CFD) and finite element (FE)
- Computer aided design (CAD) and 3D structural models for BIM integration
- Local code compliance of concrete foundations, anchoring systems and structural design



Fabrication & Supply

- ISO 9001:2015 certification ensures that the highest quality standards are followed
- Global manufacturing capability offering the highest quality materials and production techniques
- Custom-manufactured solutions to meet unique project requirements



Delivery

- GRE material delivered to any location in the world via truck, rail, ocean or air freight
- All material is professionally packed in easily-handled bundles
- Project management team oversees design, delivery and construction to meet schedules and deadlines



Installation

- BDI’s staff of field technicians provide site assistance to ensure a smooth and efficient installation
- Our diverse capabilities enable BDI to offer turnkey installation service
- All BDI projects are backed by a performance guarantee and material warranty



Performance Verification

- Upon completion of an installation, BDI can assist with field validation of the GRE performance
- Field measurements of jet blast exhaust, air flow and acoustic performance are compiled into a report
- BDI’s R&D department uses field data to develop new products and solutions



Support

- Spare parts and replacement components are stocked at various BDI facilities around the world
- Refurbishment program to evaluate and repair older facilities to extend service life
- Archives of documentation and details from more than 1,500 past projects available

A RUN-UP NOISE SOLUTION



BDI's approach is based on providing our customers with the highest quality products and services that match our international reputation of performance and value earned over the last 60 years. This reputation includes technically-sound designs, timely deliveries, professional installation and outstanding post-project customer service.

The combination of the aerodynamically advanced Stable Flow™ design with the effectiveness of Noise Blotter™ acoustic panels provide an aerodynamically efficient GRE with very high usability and outstanding noise reduction.

BDI can design and build ground run-up enclosures for any aircraft mix including commercial, general aviation and military.

BDI utilizes the latest aerodynamic, acoustical and structural software packages, combined with scale modeling and field measurements, to ensure project requirements are met.

Let us assist you with your project by providing a complimentary analysis demonstrating how BDI's GRE technology can mitigate a specific ground run-up noise challenge.



St. Louis (USA)



Bangkok (Thailand)



Bogotá (Colombia)



Dubai (UAE)



Albany (USA)

THE AERODYNAMIC CHALLENGE

Running aircraft engines at high power settings while stationary can be challenging for various reasons:

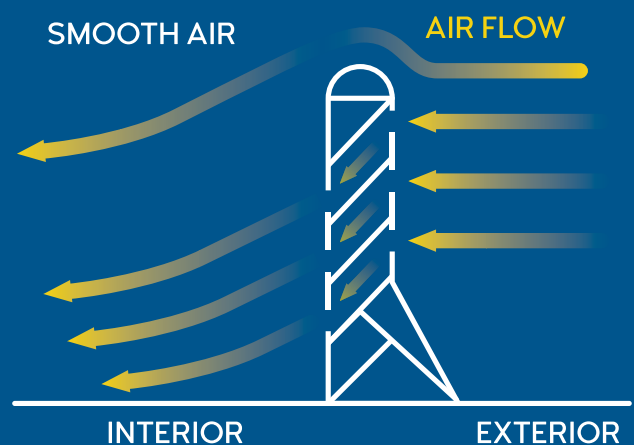
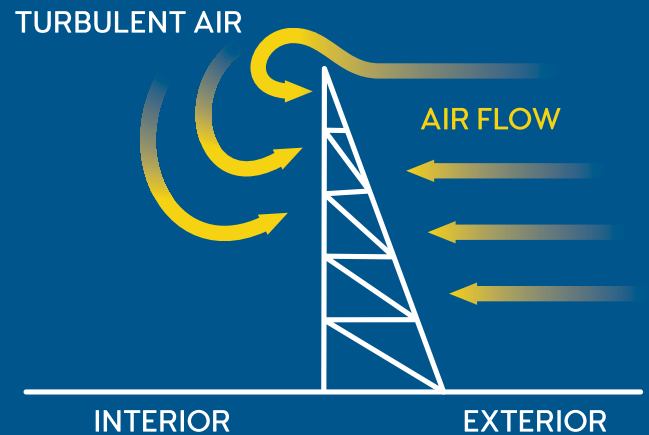
- Aircraft engines require smooth and turbulence-free air
- Modern aircraft are efficient and powerful, and the latest turbofan engines use high bypass ratios with larger fan diameters that are closer to the ground than previous generation aircraft, which can create significant aerodynamic challenges
- Ground-running aircraft in a GRE is more complicated than open-field conditions due to the fixed facility orientation, tall acoustic walls, and atmospheric conditions
- Successful ground-running of aircraft engines requires avoiding turbulence at the nacelle (inlet)

BDI'S SOLUTION

Through the use of scale model testing, computational fluid dynamics (CFD) and field evaluation of more than 30 completed facilities, BDI's GRE facilities have innovative aerodynamic features that maximize facility usability.

"Users of the Billy Bishop Toronto City Airport are able to successfully test aircraft inside the BDI GRE in almost all wind conditions ensuring excellent facility usability." - PortsToronto

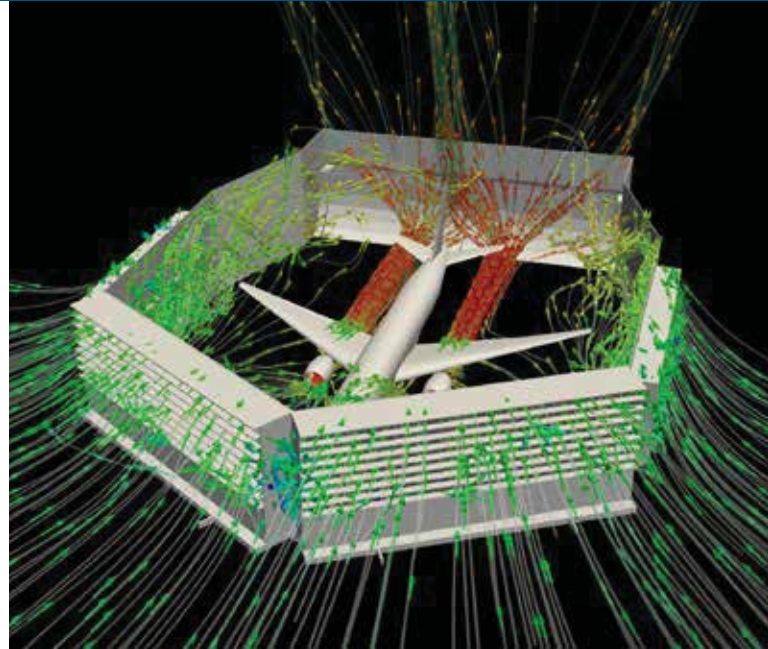
Bojan Drakul | Manager – Infrastructure, Planning and Environment



GRE aerodynamic design is a critical factor in usability. An aerodynamically efficient, curved jet blast deflector at the rear of the GRE redirects the jet blast vertically and maintains the jet efflux momentum to drive the flow inside the facility.

Our 3-sided GRE design starts with sloped entry walls with a rolled top to improve airflow into the facility and eliminate vortex formation, due to separation, at the front and top of the side walls.

Our 4-sided GRE design uses large, vented front gates with sufficient open area to supply the necessary air into the facility. The side walls of our GRE facilities use large, acoustically-treated vents to provide engine entrainment air and to improve usability in cross-wind conditions.



BDI's patented, vented rear-wall, the Vertivent™, directs entrainment air to the discharge lip of the jet blast deflector. The Vertivent™ improves the jet blast discharge angle, reduces high intensity turbulence due to the jet blast discharge, and dramatically improves usability in tail wind conditions. BDI GREs are designed to use the momentum of aircraft engines to smoothly drive air with minimal turbulence generation, not only through the jet engines but through the entirety of the facility. Our aerodynamic know how and the outstanding performance of our facilities is one reason BDI builds the best GREs on the market.



Sloped entry for high usability in quartering head winds

Acoustically treated side walls with aerodynamic vents

Curved Vertivent™ jet blast deflector incorporated into the rear wall system for high usability in tail winds

Rolled top for improved performance in crosswind conditions



St. Augustine (USA)



Indianapolis (USA)



Winnipeg (Canada)



Milwaukee (USA)



Detroit (USA)

NOISE ATTENUATING TECHNOLOGY

Engine run-ups typically occur at night, precisely when communities near airports are most sensitive to noise. With over 30 successful GREs constructed to date, BDI understands that the primary reason to build a GRE is the acoustic benefits such a facility brings to airports and communities. BDI works with all stakeholders to develop a solution that, first and foremost, meets the project's acoustic requirements.



Example of noise contour without GRE



Example of noise contour with GRE

50-60 dBA

60-70 dBA

70-80 dBA

80-90 dBA

90+ dBA



Norfolk (USA)



Oakland (USA)



Chicago (USA)



Portsmouth (USA)



Sofia (Bulgaria)



BDI uses the latest computer noise modeling programs and truly understands the complex issues and regulations involved in analyzing aircraft noise challenges. BDI's GREs incorporate high-performance materials and designs in our patented Noise Blotter™ acoustic panel, which were designed specifically for control of the low frequency noise generally associated with aircraft ground run-ups.

These panels feature a high transmission loss (STC) of 36 and effectively absorb low frequency noise. These panels have demonstrated a noise reduction coefficient (NRC) of 1.25 and maintain an absorption coefficient of 1.0 at 100Hz. The use of hydrophobic materials and acoustically-transparent wrap materials ensure that the panels will provide a long, maintenance-free service life.



Ashgabat (Turkmenistan)



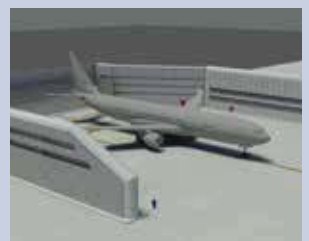
Everett (USA)



Tampa (USA)



Subang (Malaysia)



Al Ain (UAE)

THE ORIGINAL EXPERTS



Founded in 1957 in San Francisco, Blast Deflectors, Inc. is a world leader in jet blast deflectors and aircraft acoustic enclosure technology. Our innovative solutions have set the standard for the jet blast deflector industry for more than 60 years. We safeguard our reputation for excellence through a focus on research and development combined with state-of-the-art manufacturing. The result is a complete range of jet blast deflectors suitable for all applications.

BDI works with aircraft manufacturers, civil aviation authorities and airport consultants to analyze the potential jet blast impacts of aircraft. That, coupled with our years of experience and thousands of successful installations across the world, allows us to plan, design and implement the most cost effective and practical solutions. BDI's commitment for customer service and continuous improvement is evidenced by our ISO 9001:2015 certification.



A FOCUS ON QUALITY

BDI has a long history of consistently providing quality blast deflectors and ground run-up enclosures that meet project requirements. This commitment has been reinforced by receiving registration to ISO 9001:2015 standards.



“After more than ten years of service, Emirates Airline continues to be very happy with the GRE facility by BDI, which is used on a daily basis for ground run-ups.” - Emirates Engineering

Robert Aiken | Senior Manager Eng. Facilities



Step 1: Site Preparation



Step 2: Civil Construction



Step 3: Steel Erection



Step 4: Acoustic Panels Installed



Step 5: Aerodynamic Features Installed



Step 6: Aesthetic Cladding Installed



Step 7: Acceptance Testing



Step 8: Facility Put Into Service

BDI closely controls the construction activities for each GRE project site using both on-site personnel and remote web-based monitoring in order to ensure optimal quality standards are followed.

Featured Facility: Toronto City Airport



LET BDI'S 60+ YEARS OF EXPERIENCE BENEFIT YOUR PROJECT

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- Jet Blast Deflectors
- Ground Run-up Enclosures
- Visual Screens
- FOD Barriers
- Acoustic Barriers



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