Blast-Safe™
Jet-Blast/Perimeter Security Fence

Design Book
Jet-Blast Barrier Fence
For Protecting Airport Assets

Transpo’s Blast-Safe™ Jet-Blast Barrier Fence provides positive protection for pedestrians, ground vehicles and other airport facilities that may be subjected to jet-blast hazards from nearby runways, taxiways and tarmacs. The key component of the system is a unique double-reverse corrugated steel fabric, originally developed for NASA. Blast-Safe’s “open” structure allows jet-blast air to be diffused safely through the system, while preventing any penetration of sand, stones, or other damage-causing debris. The system also acts as security fence, noise attenuation barrier and glare screen for added safety benefits.

Blast-safe installations are custom designed to fit existing airport layout and geometry, promoting maximum utilization of limited right-of-way space.
Say Good Bye to Jet Blast Hazard

Features and Advantages

■ **Narrow Profile:** Blast-Safe installations, up to 14-ft high, incorporate stand-alone post construction, which minimizes lateral space occupied by the barrier. This design characteristic saves valuable facility land area, and allows placement of barrier in existing “tight” locations.

■ **Superior Jet-Blast Protection:** The key component of Blast-Safe is the double-reverse corrugated steel fabric, which safely diffuses high-velocity jet-blast streams, and prevents penetration of solid debris. The diffusion process offers superior protection because it physically dissipates jet-blast hazards.

■ **Modular Construction:** Blast-Safe’s modular components may be constructed on-site, or pre-assembled and quickly erected in place to minimize delays in airport operations.

■ **Custom Designed:** Each Blast-Safe installation is custom designed to ensure proper height, strength, and layout for your application. Access doors for personnel and equipment, lighting, and other site-specific features are easily incorporated into the system for added safety and convenience.

Transpo engineers design each fence to meet the requirements of the facility owner.

Technical Data

■ **Sizes:** Blast-Safe is custom designed to fit a wide variety of site characteristics. Length, height, and strength of the system are varied depending on type, proximity, and operational conditions of adjacent aircraft. Typical Blast-Safe installations are 8, 10, 12, or 14 ft high. Custom heights are available.

■ **Materials:** Blast-Safe’s sheathing is 25 gage double-reverse corrugated steel fabric, galvanized in accordance with ASTM A653, Coating Designation G90, All framing components are fabricated from standard structural steel shapes galvanized in accordance with ASTM A123. All hardware is structural grade and galvanized in accordance with ASTM A153. Steel-reinforced concrete footings are designed for site-specific jet-blast loading and local soil conditions.

■ **Design Plans and Specifications:** Transpo engineers are available to evaluate proposed Blast-Safe locations, and prepare detailed construction plans and specifications in conjunction with airport staff and consulting engineers. We assure that each Blast-Safe installation meets the highest safety standards and provides the best solution for protecting your valuable airport assets.
Transpo Blast-Safe™ Jet-Blast Barrier System
GUIDE SPECIFICATION

GENERAL

Certain Related Construction Specified In Other Sections:
A. Concrete and concrete reinforcement for foundation.
B. Excavation and backfill.
C. Grounding and obstruction lighting.

SUBMITTALS

Shop Drawings: Prior to commencing fabrication the Contractor shall submit detailed Shop Drawings of Blast Fence assemblies to the Engineer for approval in accordance with the section entitled “Working Drawings and Catalog Cuts”.

DESIGN CRITERIA:

Jet-Blast fence assemblies shall be designed in accordance with the “AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” and with applicable sections of the “AASHTO Standard Specifications for Highway Bridges” governing allowable fatigue and stress, as indicated on the Contract Documents.

Jet-Blast fence shall be designed to resist a 130 mph jet-blast velocity, in the direction of applied jet-blast force as indicated on the plans.

PRODUCT DESCRIPTION:

Jet-Blast fence system shall be “Blast-Safe”, a fully galvanized jet blast barrier system, fully relocatable type, as manufactured by Transpo Industries, Inc., New Rochelle, NY, all designed in accordance with “General Description” above and conforming to dimensions and types as shown on Contract Documents. The Contractor shall furnish anchor bolts and steel setting templates for installation under the Section entitled “Concrete”. Anchor bolts shall be galvanized after fabrication in accordance with ASTM A 153.
A. **MATERIALS:**

1. Post Base Plates and Gussets shall be fabricated from structural steel plate per ASTM A36.

2. **End and Corner Posts** shall be fabricated from structural steel tubing per ASTM A 500, Grade B.

3. **Intermediate Posts** shall be fabricated from structural steel I-beam per ASTM A36.

4. **Horizontal Angle Braces and Tabs** shall be fabricated from structural steel angle per ASTM A36.

5. **Vertical Pipe Stiffeners** shall be fabricated from Schedule 40 steel pipe per ASTM A53, Grade B, Type E, Galvanized, and supplied with end caps.

6. **Barrier Fabric** shall be Double Reverse Corrugated steel sheet per ASTM A 653, Galvanized Coating Designation G90.

7. **Anchor Bolts** shall conform to ASTM A449

8. **Structural Bolts** shall conform to ASTM A325.

9. **Nuts** shall conform to ASTM A563, Grade DH.

10. **Lock Washers** shall conform to ANSI B-18-21-1.

11. **Flat Washers** shall conform to ASTM F436.

12. **Welding Electrodes** shall conform to E70XX, or approved equal.

13. **Galvanized Coatings:** All structural steel materials shall be galvanized after fabrication in accordance with ASTM A123, and all hardware shall be galvanized after fabrication in accordance with ASTM A153.
B. CONSTRUCTION METHODS:

Excavation for foundations shall extend to the depth shown on plans. Surrounding soil shall remain undisturbed using methods approved by the Engineer. Reinforcing Bars shall be placed in the locations shown on the plans. Anchor Bolts shall be located to match the specified bolt configuration of the post base plates. The projection height of each anchor bolt shall be 3-1/2 in ± 1/2 in (89 mm ± 13 mm). Concrete shall be placed and consolidated in accordance with ACI standard procedures. Top surface of all foundations shall be smooth, level, and at the same elevation, ± 1/2 in (13 mm). Concrete shall cure for a minimum of seven (7) days prior to backfilling. All excavation adjacent to foundations shall be backfilled and compacted prior to erection of the Jet-Blast Fence superstructure.

Posts Shall be positioned plumb on top of the foundations. Flat washers shall be placed on each anchor bolt on top of the base plate. All base plate nuts shall be tightened on to the anchor bolts in accordance with American Institute of Steel Construction (AISC) Turn-of-Nut Tightening Methods.

Horizontal Angle Braces shall be positioned level at their proper locations as shown on the plans, and secured with bolts, lock washers and nuts. All nuts shall be tightened in accordance with American Institute of Steel Construction (AISC) Turn-of-Nut Tightening Methods.

Barrier Fabric and Vertical Pipe Stiffeners shall be installed starting at the top of the barrier at an End or Corner Post. Fabric panels shall be held in position while a Vertical Pipe Stiffener is threaded down through holes in the Horizontal Angle Braces and corrugations in the fabric, one fabric panel at a time. Once one end of a fabric panel is secured, the fabric shall be pulled taut while the next adjacent Vertical Pipe Stiffener is threaded down through the closest corrugations in the fabric. Fabric shall remain taut throughout the barrier system with no sags permitted. Joints between fabric panels shall occur only at a post. Excess fabric remaining at the end of a run shall be cut off leaving sufficient material for a solid connection to the last Vertical Pipe Stiffener. Fabric installation shall progress down the fence until all Vertical Pipe Stiffeners reach the bottom Angle Braces. Pipe caps shall be secured to both the top and bottom of each Vertical Pipe Stiffener.
1. **Footings:**
Working from the shop drawings provided by Transpo, the footings can be sized and centered using the dimensions shown. Note: It is very important for all footings to be level with respect to each other. Adjustment nuts under the base plates may be required to level the posts. Generally, the footings are spaced 7'-0" (2.133m) on center. When the length of the run is less than equal increments of 50 feet, the lesser dimensions will occur at the ends of the runs. This will be noted on the shop drawings. The anchor bolt locations for the attachment of the plated steel posts are shown on the **Foundation Detail** sheet.

2. **Assemble Framing:**
After the **End Posts** and **Intermediate Posts** have been placed on the footings and loosely tightened, install the **Angle Connectors**. Note, install the **Angle Connectors** on the **Intermediate Posts** first. The hole pattern and length is slightly different from the **Angle Connectors** that are attached to the End Posts. Check shop drawing for dimensions and part numbers.

After all the **Connectors** are in place, plumb and level the entire framing assembly. It is recommended that you start from the center of the run and work to the ends. After the entire framing assembly is leveled, re-tighten the plated posts to the foundations anchors.
3. **Prepare DRC Fabric:**
The barrier fabric is banded in 50 foot rolls. **Do not** cut the banding until you are ready to install the fabric. Begin the installation of the fabric by lifting the entire 50 FT roll to the top of the blast fence. Using a pallet and fork lift will facilitate the installation of the barrier fabric. Unband the roll of DRC and attach the fabric to the first hole in the angle bracket of the **End Post** using the ¾” Stiffener Pipe.

4. **Installation of Barrier Fabric and Vertical Stiffener Pipes:**
Step One – Starting at the upper left **End Post**, position **Barrier Fabric**, stringing the 50 FT roll the full length of the fence. It is recommended that “tie backs” or “bungee cords” be used at each post to hold the fabric in place against the face of the I Beam. **Rubber banded metal “J” hooks** work well to hold the **DRC fabric**. From behind the fence, hook one end of a 24” rubber banded metal “J” hook to the fabric and run it behind the beam, hooking again to the fabric on the other side of the beam. This will hold the fabric tight against the beam, but also allow it to move as you insert the vertical **Stiffener Pipes**.
**Step Two** – Attach the “come-a-long” harness bar provided by Transpo to the end of the DRC fabric roll, by inserting it through the last row of octagonal holes in the barrier fabric. Attach “Wire Rope” to ends of bar that extend beyond the width of the fabric. Secure wire rope and attach the “come-a-long” to the second Intermediate Post beyond the end of the roll of barrier fabric. Draw the fabric taut using the come-a-long, but **do not** stretch the fabric.

**Step Three** – Insert first Stiffener Pipe (sized for the height of the fence) thru the top row of the Horizontal Angle Connector where the hole is located. Align the fabric so the stiffener pipe can be pushed through the first row of fabric. When the stiffener pipe is extended thru the first row of fabric, attach a rubber tipped “close pin” to the Stiffener Pipe above the line of the fabric to prevent the pipe from dropping completely. Note: Pipe Cap should be secured to the “top” end of the stiffener pipe before inserting into the barrier fabric.
Step Four – Align the **Barrier Fabric** at the second **Intermediate Post** using the come-a-long. **Do Not** over stretch the fabric. No more than a one inch “pull” or “release” is required to position the fabric for the **Stiffener Pipe**. Insert the **Stiffener Pipe** through the **Barrier Fabric** until it extends beyond the end of the fabric. Secure the **Stiffener Pipe** using the rubber tipped close pin above the line of the fabric.

Step Five – Insert next **Stiffener Pipe** through the **Horizontal Angle Connector** where the hole is located. Align the fabric using the come-a-long so the stiffener pipe can be pushed through the first row of fabric. **Do Not** over stretch the fabric. Insert the **Stiffener Pipe** through the **Barrier Fabric** until it extends beyond the end of the fabric. Secure the **Stiffener Pipe** using the rubber tipped close pin above the line of the fabric.
Step Six – Continue installing the Stiffener Pipes until the first row of fabric is fully attached to the Intermediate Posts. Each new row of Barrier Fabric is installed using the procedures in the Steps outlined above.

5. Cutting the Barrier Fabric:
When you have secured the 50 FT roll of DRC fabric, you will need to cut the excess fabric at the intersection of the Angle Connectors (see photo). To cut the DRC fabric, use a carbide tipped blade. Cut between the rows of corrugation on the “flat” surface of the fabric, using caution not to cut so close as to open the “hexagon” row of the DRC. Discard the cut end of DRC fabric, approximately one foot of waste.

6. Starting the Next Roll of Barrier Fabric:
The beginning of the DRC roll has a starter tab. This starter tab is placed over the cut edge of the previously installed roll of Barrier Fabric. Secure the new roll with the ¾” Stiffener Pipe and continue the installation as described above.

7. Final Completion:
To complete the final segment of the barrier fabric it may be necessary to mount the come-a-long to a stationary fixture like a truck or back hoe vehicle. To complete the installation, it is necessary to place the Pipe Caps securely at the top and the bottom of each Vertical Stiffener Pipe. The Pipe Cap is designed to keep moisture out of the Stiffener Pipes and prevent varmint from nesting within the system.
START UP SHOWING DRC FABRIC ROLLS
DRIVING STIFFENING PIPES TO ALIGN FABRIC
END POST FRAMING

90 DEGREE ANGLE
INSTALLATION OF DRC FABRIC WITH PULL-A-LONG
DRC FABRIC ROLLS