



DALLAS/FORT WORTH  
INTERNATIONAL AIRPORT

# SECURITY CHECKPOINTS Tiger Team 2006 Refinements and Appearance Guidelines



August 2006

PLANNING DEPARTMENT

	Page
Executive Summary	3
Objectives	4
Procedure	5
Standard Improvements	10
Conclusions	13
Appendix A, Bin Holder and Podium Study	A-1

### **Background**

Following up on the successful Tiger Team 2005 study which resulted in a 33% throughput increase and a 43% wait time reduction at DFW Airport, the cross-organizational team re-convened to explore further improvement opportunities.

### **Objectives**

Multiple airline relocations at DFW, following the opening of the new international Terminal D, yielded a need to revisit checkpoint locations and capacities. Also, it was important to identify those locations where throughput could be significantly increased with capital improvements. Finally, there was an interest in establishing guidelines for the checkpoint furniture and equipment in order to improve the appearance.

### **Findings**

The Airport environment is dynamic and within twelve months, security needs had changed significantly for two of the Airport's 18 checkpoint locations. One checkpoint that was slated for closure in the 2005 plan will remain operational and requires capital improvements to improve the flow. A second checkpoint now requires an additional lane to be viable for the next several years, and expansion alternatives are being explored.

The TSA began using a flexible team that could rotate checkpoint locations to better accommodate peak loading periods across the Airport. Given this capability, it now becomes more feasible to equip the checkpoints for peak demand periods, giving the TSA the option to staff according to greatest need.

Checkpoint appearance guidelines can facilitate a standard, uniform, pleasing and orderly checkpoint appearance by clearly communicating expectations. A pleasant appearance reduces passenger anxiety and improves the experience.

### **Results**

Potential for increased throughput via capital improvements has been identified for multiple checkpoint locations with initial focus on the two with significantly increased demand. Recently completed construction at one checkpoint has resulted in a 104% throughput increase. Factors contributing to this increase include improved divesting space, photographic signage, and an enlarged queuing area to promote order and reduce congestion.

The Tiger Team 2006 focus on improving DFW's checkpoint appearances, by creating fluidity and continuity between terminals and the checkpoints within them, resulted in the [DFW Airport Security Checkpoints: Appearance Guidelines](#) document. This document details the aesthetic guidelines for all current and future checkpoint improvement projects at DFW Airport.



The DFW Planning Department operated as an in-house consultant, leading the initiative with six primary objectives for the review.

- 1) **To determine the impact of multiple airline relocations**
  - To evaluate changes in demand
  - To identify checkpoint locations for closure, consolidation, and expansion
- 2) **To further improve throughput capacity**
  - To minimize processing time
  - To further improve signage
  - To reduce congestion at the ticket checker
  - To further improve divesting layouts with maximized divesting space and improved passenger flow
- 3) **To continue to build a partnership with the TSA, air carriers, and DFW staff**
  - To fully understand each party's issues
  - To seek collaborative solutions
- 4) **To improve the security checkpoint environment for the passengers**
  - To reduce anxiety
  - To improve ease and speed at which passengers process through the checkpoint
  - To maintain high levels of customer satisfaction
- 5) **To establish and document Appearance Guidelines for DFW Airport security checkpoints**
  - To improve the aesthetics of each checkpoint
  - To create continuity between terminals and the checkpoints within them
  - To provide semblance of checkpoint appearance across the Airport
- 6) **To develop a process for on-going reviews**
  - To identify times throughout the year to review security checkpoints
  - To have other stakeholders recognize that this is an on-going process

## General Procedure

The cross-organizational team met to define the study objectives, set project priorities, and determine role responsibilities. During 2005, expansion and consolidation plans had been developed for eight DFW checkpoints. One checkpoint construction project was underway, but the rest needed review due to the relocation of airlines during the past year that significantly affected two of the Airport's terminals. Also, prioritization of these projects would depend on identifying the greatest need.

## **Discussion Points**

- 2005 Checkpoint changes, what worked well and what could still be improved
- Current efficiency levels
- Current passenger wait times during peak periods
- Anticipated needs for summer 2006, by terminal and by checkpoint
- Communication element between the airlines and the TSA
- Airline relocations and traffic shifts between terminals
- Factors affecting checkpoint staffing, including airline relocations, charter activity and R&R flights
- Current operational constraints unique to specific checkpoints
- 2005 proposed expansion/consolidation/closure plans
- Current checkpoint construction project
- Process for addressing problems with checkpoint equipment
- Checkpoint facility standards
- Location of Ambassador podiums
- Timing of re-direction of passengers to another checkpoint
- Effective queuing methods to keep the checkpoint busy
- Exit lane requirements
- Signage Improvements
- Schedule for ETP installations

### Re-Evaluation of 2005 Expansion/Consolidation/Closure Plans

Several airline relocations followed the opening of DFW's new International Terminal D in July 2005. These moves were completed in July 2006. Due to these moves, in addition to changing business plans for some carriers, it was apparent that the anticipated needs projected only twelve months prior had increased.

#### **Objectives**

- To respond to the increased demand
- To keep wait times low
- To retain high customer satisfaction
- To improve current layouts for greater efficiency
- To reduce queuing problems in bag claim and ticketing areas

#### **Procedure**

- Performed assessment of current wait times during peak periods
- Evaluated demand for each checkpoint
- Observed current operations during peak periods
- Identified capacity constraints due to current facilities
- Surveyed checkpoint staff for observations and recommendations
- Gathered growth projections from Air Service Development and from current airline managers
- Explored potential security checkpoint locations that provided more space, allowing implementation of optimal layout
- Compared plans against the long-term vision for the airport facilities
- Developed capital improvement options and associated costs
- Minimized impact on surrounding concessions, ticket counters, bag claim areas, hold rooms and traffic corridors

#### **Findings**

- Priority was focused on two checkpoints (B19 and E15/E16)
- E15/E16 which was slated for consolidation now requires an additional lane
- B19 must now remain operational and had previously been slated for closure
- Significant flow improvements are needed and possible for both checkpoints
- Capital investments are required to gain these significant improvements

#### **Results**

- Identification of two checkpoints requiring immediate improvements
- Strengthening of the cross-departmental and cross-organizational team
- Improved communication
- A pro-active effort by the Airport to provide the facilities
- A pro-active effort by the TSA to provide the staffing flexibility
- Improved responsiveness to the airlines' needs

## Further Improvements to 2005 Implementation

### **Study for Bin Holder and Podium Re-Design**

After using the bin holder for several months, the group questioned whether a redesign of the bin holder could provide easier access from both sides. Two designs were manufactured and tested. (See Appendix A for study detail.)

#### **Bin Holder Results**

- Backless bin holder design
- Provides easier access for the TSA to restock the bins
- Better bin availability at all divesting lanes
- As bin holder replacement is necessary, the new design will be installed



**Figure 1.** Bin Holder

#### **Podium Results**

- Improves checkpoint appearance
- Provides a useful and comfortable workspace for the ticket checkers (See [DFW Airport Security Checkpoints: Appearance Guidelines](#) for podium specifications.)



**Figure 2.** Podium

**Study of Queue Entry/Ticket Checker Placement**

Concern that the ticket checking function could restrict the flow to the divesting areas resulting in unproductive time for the x-ray (which was identified as the critical element during the Tiger Team 2005 study), led to a review of this portion of the process.

**Observations**

- Delays occurred when passengers arrived at the checkpoint with too many bags
- Groups tend to spread out, preventing those behind from going to an available ticket checker and causing delays
- Delays occurred when passengers could not see the available ticket checkers due to congestion at the ticket checker location
- Tables too close to the ticket checkers blocked flow from the queue line into the divesting area, creating delays and sometimes leaving the further divesting lines unoccupied. This can result in unproductive time for those x-rays.
- Bins were sometimes unavailable when needed due to lack of restocking by the TSA staff
- TSA staff often stocked the easiest to access bin holders rather than the ones with most need

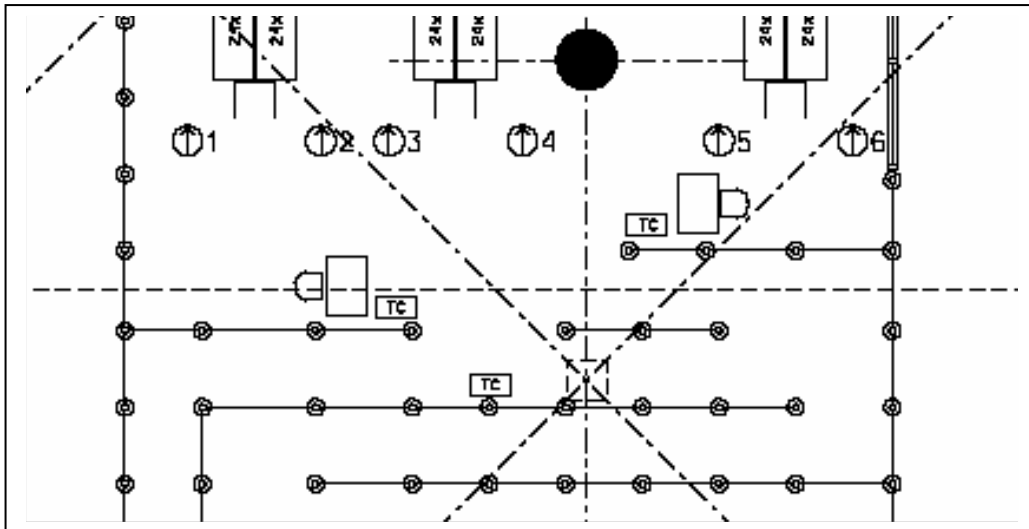


## Findings

- Spreading the ticket checkers apart provides higher visibility and better flow
- A three lane checkpoint needs a minimum of two ticket checkers during peak times
- Dividing the queue into two lines just prior to the ticket checker reduces the potential for groups to spread out and block the flow
- Staggering the ticket checkers allows easier access by groups within the limited space allowed
- Eight to ten feet of clear space is required for one group to pass another
- Ticket checkers can assist with directing passengers to open divesting lanes

## Three key factors improved the flow.

- 1) More space
- 2) Improved visibility of available ticket checkers
- 3) Providing a bypass around groups and other causes for delay



**Figure 3.** Queue split just prior to ticket checker. Ticket checker spread locations to prevent blockage (TC refers to 'Ticket Checker' location).

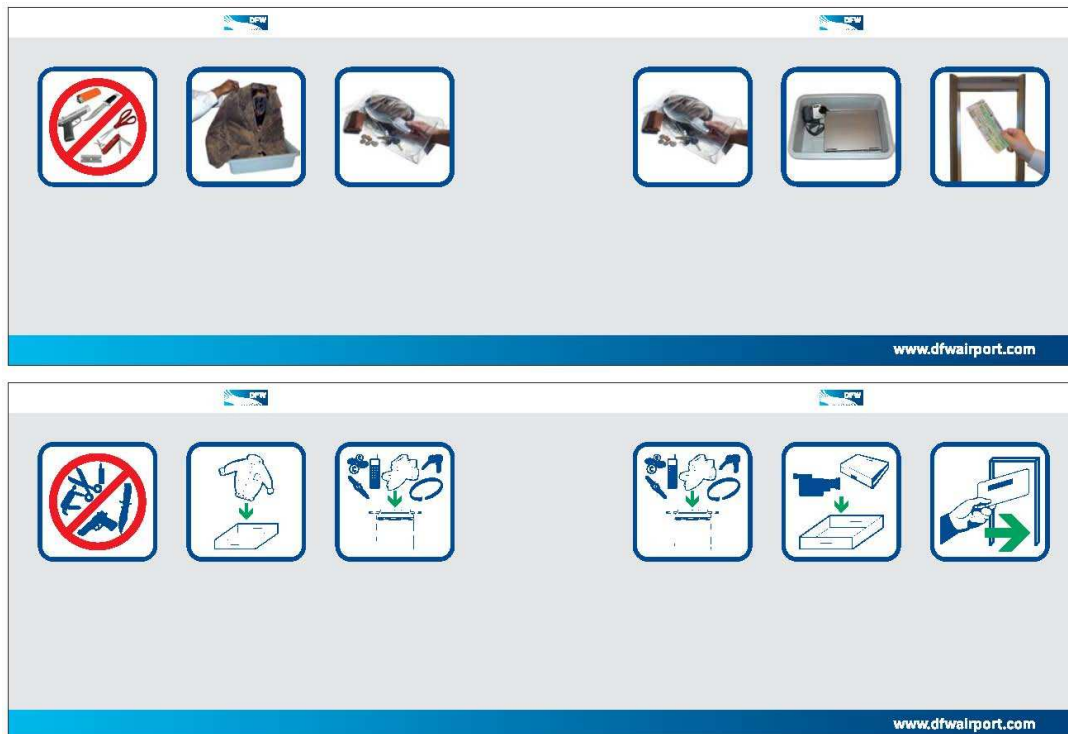
## Results Implemented

- Split queue line just prior to ticket checker
- Separated ticket checker locations to improve visibility and accessibility
- Provided additional clear space around ticket checkers to allow groups to pass
- Provided one bin holder for every 12 linear feet of table space
- Requested that ticket checkers direct passengers to open lanes
- Requested that TSA place tubs where needed, rather than closest bin holder
- Ensured amount of table top space maximizes divesting w/out impeding flows

## DIVESTING SPACE

### Signage Improvements

- Pictograms on existing divesting signs were replaced with photographs.
- Photographs more clearly depict the divesting process. See *Figure 4* below.



**Figure 4.** New photographs (top) replaced previous divesting pictograms (bottom) from 2005 study.

### Queuing Layout

- The queue line was split just prior to the ticket checker. This prevents delay and passenger backup that results from a single ticket checker location.
- The split line allows passengers to bypass large groups such as families that may need additional time for the ticket checker to verify their identification and to access an available ticket checker.
- Ticket checkers were encouraged to direct passengers to open lanes on both sides of each divesting table.

### Table Layout

- Where space permitted, additional 4-foot tables were provided at the front of the divesting area.
- The additional tabletop area helped to relieve congestion by pulling more passengers from the queue line into the divesting area, and maximized the utilization of previously unused space.

- Where space was limited, increasing walking path space by using smaller tables allowed better flows, increasing the resulting throughput.

### Results

- As a result of the divesting space improvements, the primary implementation site, E33, has experienced a 104% increase in capacity, from 141 to 289 passengers per lane per hour.
- The resulting ticket checker reconfiguration was implemented in Terminal D and has reduced the occurrences of unused, but available, ticket checkers.
- The signage improvements have primarily improved the recognition of the 'Boarding Pass in Hand' message.
- The improvements in table size versus flow space allocation have produced smoother flows in multiple terminals.

### APPEARANCE GUIDELINES

#### Findings

- Checkpoints feel more open and visibility of passengers for TSA personnel is increased when neutral colored equipment and furnishings are used.
- Dark colors, used sparingly, can emphasize decision / transition points such as ticket checker podiums and bin holders.
- Consolidating checkpoint signage into fewer locations reduces visual clutter that distracts both passengers and TSA personnel.
- The high volume of passengers requires equipment and furniture to be durable. High impact finishes that require little maintenance, such as stainless steel, are preferred.

#### Results

- In coordination with layout and process improvements, the execution of Appearance Guidelines at our primary implementation site, E33, provided checkpoint appearance updates.
- DFW Airport Security Checkpoints: Appearance Guidelines identifies and illustrates general furnishings, TSA equipment and furniture, signage, and construction materials to be used in current and future checkpoint improvement projects at DFW Airport.
- These guidelines are an attachment to this document.

DFW International Airport is committed to providing an efficient, thorough and pleasant experience for passenger security screening. This is demonstrated through an ongoing review process that nurtures the working relationship among TSA, airlines, and the airport itself. Additionally, this is demonstrated through a continuing commitment to invest capital funding for projects with demonstrated value-added for our customers.

- Capital improvements to E33 gained a 104% increase in throughput capacity (from 141 to 289 passengers per lane per hour) and provided ample queue space to reduce congestion in ticketing and bag claim areas.
- Because the Airport environment is dynamic, continuous review and stakeholder communication is key to a pro-active, collaborative effort to maintain both high security standards and high levels of customer satisfaction.
- On-going Review
  - Christmas Review: October 2006
  - Tiger Team '07: February 2007
- Appearance Guidelines will guide both current and future checkpoint projects toward a uniform and updated appearance.
- This information will be available for distribution on the DFW Airport website: [www.dfwairport.com](http://www.dfwairport.com).

Observations were made at Security Check Point C21 from the check point entry.

## PODIUMS

We replaced the existing ticket check podium with a prototype.

### Benefits

- The height worked well with the stools used by the Prospect agents.
- The writing surface material was preferred by the Prospect staff to that of the prior podium.
- There are no doors on the back side of the podium.
- Dark color hides dirt and stains.

### Issues

- The adjustable shelf is supported by plastic clips.
- There is not a place for the file folder Prospect keeps at the podium.
- Plastic laminate at bottom edge of podium is susceptible to chipping. With the dark color of the laminate chips are highly visible.

### Summary

- Use a fixed shelf to increase durability. Shelf should be mounted high enough so that it is not used as a foot rest.
- Install a 12" high piece of material to act as a foot rest. Foot rest should have a metal edge for durability.
- Install a pocket, sleeve or shelf to hold Prospects file folder.
- Provide a dark metal edge along the base to protect the P-lam from chipping.

## BIN HOLDERS

C21 has two x-ray lanes, with dual divesting tables at each lane. The inboard divesting lanes are used by a majority of the passengers. The right inboard divesting lane handles the largest amount of traffic.

### Layout 1

The standard tub bin was replaced at each X-ray lane with the tall back less tub bins.

### Benefits

- Passengers placed their tubs on the divesting table perpendicular to the table length, increasing the utilization of divesting surface.
- Dark color hides dirt and stains.

### Issues

- Passengers did not notice the bins as quickly, possibly due to the darker color. May need to add graphics to the tub bins to increase visibility.
- Bins are easily moved allowing the TSA to change the layout. May need to bolt bins to tables to ensure they remain the correct position.
- Plastic laminate at bottom edge of bin is susceptible to chipping. With the dark color of the laminate chips are highly visible
- The TSA would forcefully load the bins. This created the potential for the tubs to slide out the back of the new bins.
- TSA were not comfortable stacking the bins as high with the backless design. They would stack excess tubs in front of the inboard side of the bins.

### Layout 2

At the left x-ray we placed two of the existing tub bins back to back so that each divesting lane would have a tub bin. At the right x-ray we left the new backless tub bin in place.

#### Benefits

- Passengers placed their tubs on the divesting table perpendicular to the table length, increasing the utilization of divesting surface.
- A larger number of tubs were available at the front of the check point.
- At the left X-ray the passengers utilized both divesting lanes.
- The sides of the bins offer opportunity for graphics to direct passengers to the divesting lanes.
- Dark color hides dirt and stains.

#### Issues

- The left outboard bin would run out of tubs. The TSA would keep the inboard bin full but would not restock the outboard bin.
- Two bins stands back to back created a strong visual barrier in the check point.

### Layout 3

At the left x-ray we left the two existing tub bins back to back. At the right x-ray we placed the two new backless tub bin together at the beginning of the divesting lane.

#### Benefits

- Passengers placed their tubs on the divesting table perpendicular to the table length, increasing the utilization of divesting surface.
- A larger number of tubs were available at the front of the check point.
- The passengers utilized the inboard and outboard divesting lanes.
- The sides of the bins offer opportunity for graphics to direct passengers to the divesting lanes.
- The TSA would keep both of the backless bins stocked with tubs. Since the bins did not have a back they would reach over the inboard bin to place the tubs in the out board bin.

#### Issues

- At the left x-ray lane the left outboard bin would run out of tubs. The TSA would keep the inboard bin full but would not restock the outboard bin.
- Two bins stands back to back created a strong visual barrier in the check point. This was especially apparent with the darker bins.
- The TSA would forcefully load the bins. This created the potential for the tubs to slide out the back of the new bins.

### Layout 4

At the left x-ray we placed one of the low tub bins. At the right x-ray we left the two new backless tub bins in place.

#### Benefits

- The low tub bin increased the visibility at the front of the check point.

#### Issues

- The TSA would not put very many tubs in the bin. This increased the number of trips made by the TSA to reload the bin.
- The TSA would stack tubs on the floor near the bin.
- The tub stack was not very stable and could be knocked over.
- The rim of the bin needed to be lower to allow room to grab the bottom tub.

**Summary:**

Of the layouts tested, having one tall bin holder at each divesting lane was the most efficient. Items for consideration in the next bin holder design are:

- Lower the height of the tub bins by approximately 6". This will bring the top of the bins below the graphics of the divesting table sign graphics.
- Increase the size of the slit in the bin holder to 2" so the TSA can better see the tub level.
- Provide a 1" lip at the front of the bin so tubs will not slide out.
- Provide a partial height back to stabilize the sides of the bin.
- Provide a dark metal edge along the base to protect the P-lam from chipping.
- Provide graphic at the bins to help direct passengers to the outboard divesting tables.