Breadth Analysis II: SCIF

Executive Summary

Sensitive Compartmented Information Facilities (SCIF) are proposed to be built on the first floor of 191 National Business Park. SCIFs require strict security standards for their construction, mechanical, and electrical designs. The Department of Defense (DoD) has published standards for building secure facilities.

To construct a SCIF in the proposed location, the existing mechanical system needs to be re-designed. The existing duct main above the space needed to be replaced with a new duct main which included man bars for security. A return duct was run from the existing return duct into the SCIF room. A z boot was attached to the return duct outside of the SCIF perimeter to reduce sound transfer. Finally, the planning of the mechanical duct was value engineered. It was determined that through better planning small cost savings were possible.

Introduction

The Director of Central Intelligence Directive (DCID) describes Sensitive Compartmented Information Facilities (SCIF) as either a room or an area in which Sensitive Compartmented Information (SCI) may be stored, used, discussed, or processed. SCI is any information that is classified by the United States government. Due to SCI's highly sensitive nature, there are many regulations regarding the level of classification, protection, communication, and destruction of this information (1994). Therefore, any facility which requires SCIF construction to store SCI is required to follow the physical security standards set forth by the United States government.

In the planning of 191 National Business Park, the construction of the base building was decided first. The base building is the shell of the building. Construction on the base building started first because Corporate Development Services, the building owner, had not yet decided if Northrop Grumman was going to lease the building. Shortly after the construction of the base building had started, Northrop Grumman made the decision to lease the building. Northrop Grumman then began to determine the fit out of the interior space. During fit out planning, it was determined that SCIF areas in the building were required. SCIF areas constructed in a controlled building are considered less vulnerable to penetration. Therefore the security requirements of the interior spaces are less demanding. Additional planning was still needed, however, in order to construct these SCIFs. The physical construction, mechanical, and electrical issues needed to be addressed. For this SCIF space, plumbing was not required. Therefore plumbing will not be addressed in this breadth. Mechanical re-design was necessary due to the proposed location of the SCIF. This breadth will include value engineering of the SCIF planning process.

Construction Analysis

According to the Director of Central Intelligence Directive (DCID), one common requirement for SCIFs is that all perimeter walls, ceilings, and floors must be permanently constructed and attached to each other (1994). *Table 13* presents the physical standards for the doors and windows of SCIFs.

	General Requirements	Types of Materials
Doors	- Only one primary entrance allowed. - Exit door may be required. - Doors must be closed at all times unless for emergencies. - Must be plumb in frame and of sufficient strength. - Need automatic door closure, GSA approved combination lock, and access control device. - Hinge pins located exterior of the SCIF will be treated to prevent removal.	- Solid wood core door, min 1 ¾" thick - 16 gauge metal cladding over wood or comp materials, min 1 ¾". Metal cladding continuous and cover entire front and back. - Metal fire or acoustical protection doors, min 1 ¾" - Joined metal rolling door, min 22 gauge
Windows	- Windows which allow visual surveillance must be made opaque or covered with items such as blinds to prevent surveillance. - Windows at ground level will be covered with materials to prevent entry. - Perimeter windows at ground level shall be covered by an Intrusion Detection System.	

Table 13: General Construction Requirements for SCIF Doors and Windows
(developed from the Director of Central Intelligence Directive, 1994)

Another requirement for SCIFs is that they are constructed to prevent sound attenuation. Northrop Grumman generally constructs SCIFs using double layers of drywall with insulation and 16 gauge metal studs. Northrop Grumman also uses solid wood core doors. For windows, blinds and blast resistant materials cover the opening to prevent entry and visuals. To muffle sound, a device is used to create "white noise" within the SCIF space. White noise is a combination of different frequencies of sound which mask sound. *Diagram 8* below shows a model of a typical SCIF construction for Northrop Grumman.

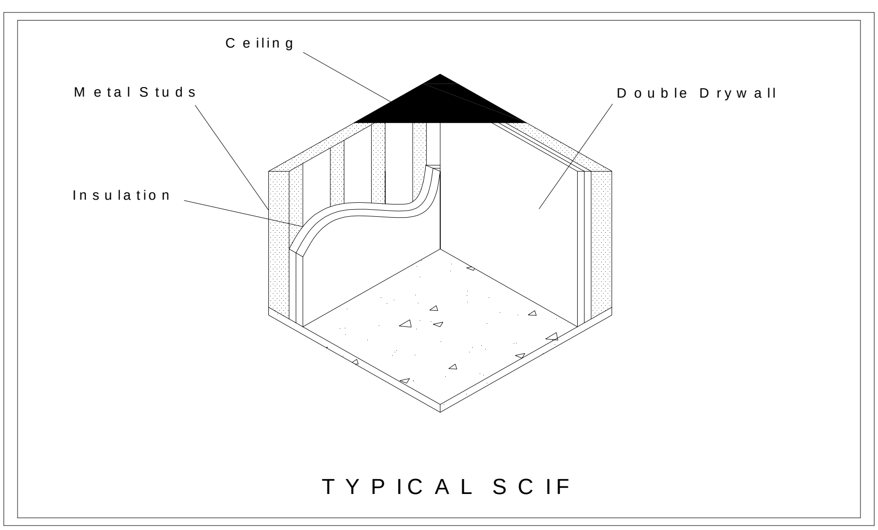

Diagram 8: Typical SCIF Model

Each sheet of drywall is typically 5/8" thick. The metal studs can range from 1 5/8" to 6". Insulation is also included between the studs and drywall.

Mechanical and Electrical Analysis

The Director of Central Intelligence Directive has specific provisions recorded for the mechanical and electrical technical requirements of a SCIF. These technical requirements for a SCIFs' vent, duct, and piping are featured in *Table 14*.

Physical protection of Vents, Ducts, and Pipes
• All vents, ducts, and similar openings in excess of 96 square inches that enter or pass through SCIF must be protected with either bars, grilles, or commercial metal duct sound baffles that meet appropriate sound attenuation. • Based on TEMPEST accreditation, it may be required that all vents, ducts, and pipes have a non-conductive section installed at the interior perimeter. • An access port to allow visual inspection of the protection in the vent or duct should be installed inside the secure perimeter of the SCIF. If the port is installed outside the perimeter of the SCIF, it must be locked.

Table 14: Construction requirements of Vents, Ducts, and Pipes for SCIF
(developed from the Director of Central Intelligence Directive, 1994)

In regards to issues relating to the mechanical and electrical aspects of a SCIF; Laura Slingerland, Southland Industries (Mechanical contractors), and John Harvey, Northrop Grumman's electrical engineering manager, were interviewed to learn more about these construction issues.

Laura Slingerland indicated that there are two main issues involved with the mechanical construction of a SCIF. First is sound transfer. Slingerland's general rule of thumb is that if light can be viewed from one area to another, the possibility of sound transfer is great. With regard to sound transfer, return ducts from the SCIF often use a sound lined z boot to solve this issue. A z boot is a metal duct unit which is shaped like a 3-dimensional letter "z." The z boot requires a lot of space and therefore the location needs to be coordinated with the other crews before the walls of the SCIF are constructed. An alternate option is to place sound attenuators inside the duct instead of using a z boot (2005).

Second is the issue to secure the SCIF to prevent unauthorized entry. The goal is to secure the walls and penetrations of the SCIF so that nothing can pass through this area. Typical penetrations may require man bars to be installed (2005). In the past Northrop Grumman has generally either installed man bars in their ducts or hard walled the ductwork. *Diagram 9* shows a z boot and a man bar detail.

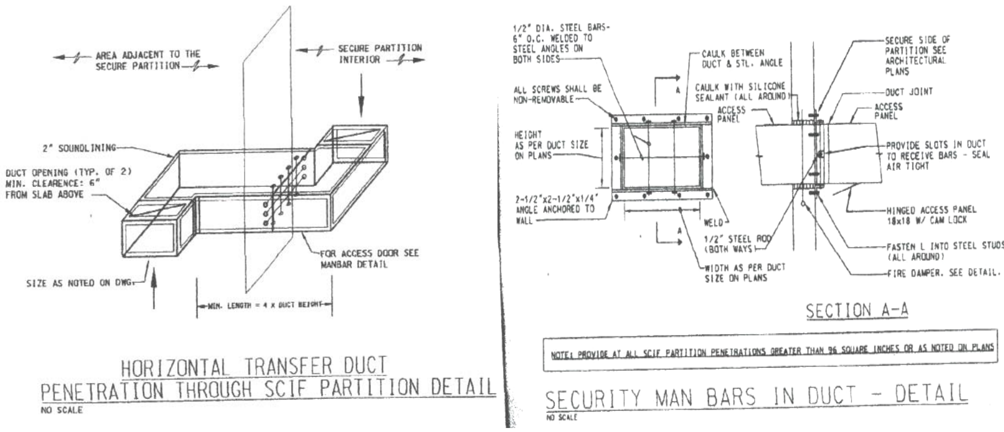

Diagram 9: Z Boot and Man Bar Detail (Slingerland 2005)

For the electrical requirements of a SCIF, John Harvey stated there are only a few main concerns that are applicable to all SCIFs. First, panel boards are to be located inside the room. Second, a dielectric is needed for all conduits running through the SCIF. A dielectric is any medium that does not allow the passage of an electric force through it. For a SCIF that requires less than 100 kVa, a UPS and a transformer is required to change the voltage. UPS stands for an uninterruptible power source. A UPS will continue providing power to the SCIF if the primary source of power goes out (2005).

Mechanical Re-design

A major issue resulting from fit out of the interiors, once base building construction has already been completed, is the additional costs that will be incurred due to changes in the building systems. For construction of a SCIF, the mechanical system is greatly impacted. The existing system needs to be removed in the area where the SCIF will be built, re-designed, manufactured, fitted with man bars (where the duct opening is greater than 96 square inches) and acoustical considerations, and then the modified duct installed. Additionally, a return duct will need to be manufactured to run from the existing return duct located centrally in the building.

Therefore it is important to look at the re-design of the mechanical system where Northrop Grumman proposes to locate the SCIF. *Diagram 10* may not be displayed on CPEP due to security reasons.

Using the Hourly Analysis Program (HAP) Version 4.20a, only 1443 CFM is needed for the air flow in the SCIF (2004). *Appendix F* contains the results from the Hourly Analysis Program. For this breadth, the number has been rounded and it has been assumed that the room needs 1445 CFM. According to the existing mechanical schedule, which is based on an open floor plan, a max of 2200 CFM is given off by the two fan powered VAV boxes in the designated SCIF area. The existing air flow and calculated air flow requirements indicate a 755

CFM difference. Therefore changes in the VAV boxes were made. The VAV box providing 900 CFM will remain and the VAV box supplying 1300 CFM will be removed. A VAV box giving off 545 CFM will then be installed in the SCIF room. The additional 755 CFM will be added to another area in the open space by installing a VAV box elsewhere.

The size of the return duct was determined using The Trane Company's Ductulator (1996) to be 20x14. The 20x14 return duct was to be run from the existing return duct to enter the SCIF space near the door. A z boot was installed directly outside the perimeter of the SCIF to prevent sound transfer.

Value Engineering

The existing HVAC system does not meet the necessary requirements for mechanical security. The system was not well planned resulting in additional costs. As explained in the mechanical re-design section, the existing system must be removed and reinstalled with duct providing the appropriate security measures.

Table 15 shows the costs associated with upgrading the existing system versus installing a secure system prior to construction.

<table>
<tr><th colspan="2">Cost for HVAC: Renovating Existing versus Installing Secure HVAC Initially</th></tr>
<tr><th>Renovation of Original System</th><th>Initially Installing Secure System</th></tr>
<tr><td>Steps:
• Existing duct and VAV boxes must be removed
• New duct manufactured and installed – including reducers, sound lining, and man bars
• 900 CFM VAV box installed
• 545 CFM VAV box manufactured and installed
• 755 CFM VAV box manufactured and installed</td><td>Steps:
• Duct manufactured and installed – including reducers, sound lining, and man bars
• 900 CFM VAV box manufactured and installed
• 545 CFM VAV box manufactured and installed
• 755 CFM VAV box manufactured and installed</td></tr>
<tr><td>Costs:
• Removal of existing supply duct- $500
• Removal of VAV box - $340
• Supply Duct Manufactured - $1000
• Return Duct Manufactured - $1700
• Man bars - $560
• 545 CFM VAV box - $550
• 755 CFM VAV box - $650
• Installation of supply duct - $480
• Installation of return duct - $630
• Installation of VAV boxes - $480
• Supply diffusers - $60
• Return diffusers - $40
• Z boot - $510</td><td>Costs:
• Supply Duct Manufactured - $1000
• Return Duct Manufactured - $1700
• Man bars - $560
• 900 CFM VAV box - $700
• 545 CFM VAV box - $550
• 755 CFM VAV box - $650
• Installation of supply duct - $480
• Installation of return duct - $630
• Installation of VAV boxes - $480
• Supply diffusers - $60
• Return diffusers - $40
• Z boot - $510</td></tr>
<tr><td>Total Cost: $7500</td><td>Total Cost: $7360</td></tr>
<tr><td colspan="2">Cost Difference: $140</td></tr>
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Table 15: Cost for HVAC: Renovating Existing versus Installing Secure HVAC Installing

(Costs developed with the help of Bob Harris, 2005 and Laura Slingerland,2005.)

This table does not include the costs associated with planning and renovating the original space versus initially planning the original space with security systems. Taking this into consideration; installing the secure system at the start would be much less expensive. Therefore using the secure system initially provides another valid value engineering suggestion for 191 National Business Park.

Conclusion

Through research on SCIFs, the standards for construction, mechanical design, and electrical design were determined. Following the United States government standards the mechanical system of the SCIF was re-designed in order to meet the security requirements. Re-designing the mechanical system also illustrates the importance of proper planning which can reduce costs associated with unnecessary rework. Planning for a secure duct initially resulted in cost savings and provided a good value engineering proposal.