A CIVIL WAR MUSEUM DESIGN: AT FREDERICKSBURG, VIRGINIA,

by:

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A CIVIL WAR MUSEUM DESIGN: AT FREDERICKSBURG, VIRGINIA

PREFACE:

This thesis is concerned with the design of a Civil War Museum depicting battles which took place in and around the Fredericksburg, Virginia, area. I chose the epic Civil War action dramatized at Fredericksburg, Virginia (1862-1864), because I was concerned with the future application for my career as an architect, with the personal significance as a subject matter, and with an integrative vehicle for my studies.

There are several objectives in the design of the museum. One is to create a level of experience which captures the emotion of the Civil War period. The museum is to act commemoratively to honor those who engaged in Civil War conflicts, by imparting significance to the valor, courage, and daring displayed. The monumentality of their actions is to be reflected in the appearance of the building, while the elements of drama and suspense are to color its content.

During the Civil War, Fredericksburg became the gateway to Richmond. Four major battles were fought at Fredericksburg. In its battles of December 1862, and at Chancellorsville during the following May, General Robert E. Lee won brilliant victories which opened the invasion to Gettysburg. In the desperate battles of the Wilderness and Spotsylvania Courthouse in May 1864, General Ulysses S. Grant destroyed the worth of the offensive power of Lee's Army and pushed onward to Richmond. Battle
scars are still visible in the streets and on the buildings of Fredericksburg. In its cemeteries lie 17,000 soldiers who fell in the Fredericksburg campaigns. Indeed, because of its role in the Civil War, perhaps no other American town has suffered the physical and economic devastation as Fredericksburg did in the battle of 1862.

HISTORICAL BACKGROUND:

The countryside in and around Fredericksburg provided the setting for four major battles of the Civil War resulting in over 100,000 casualties.

In the battle of Fredericksburg, the Federal Army commanded by General Ambrose E. Burnside arrived on the Stafford Heights overlooking Fredericksburg in mid-November 1862. However, it was not until December 11, that the Federals crossed the Rappahannock River to attack. By this time Confederate forces were firmly positioned on the high ground west of the city. On December 13 Burnside ordered two attacks. The assault at Prospect Hill against Jackson's corps achieved temporary success before being driven back. The second attack concentrated against the heart of Lee's defenses on Marye's Heights directly behind Fredericksburg. Federal soldiers were slaughtered in masses by fire from artillery on the heights and infantry behind a stone wall.

Following the Fredericksburg debacle, President Lincoln replaced Burnside with Joseph Hooker. On April 27, 1863, the new commander marched his army upstream, crossed the rivers at shallow fords, and within three days was at the Chancellorsville crossroads. General Robert E. Lee discovered this threat to his position and rushed westward. This
THE BATTLE OF FREDERICKSBURG
action prompted Hooker to abandon the initiative and establish a
defensive line which was vulnerable on the right flank. Stonewall
Jackson exploited this weakness on May 2 by leading his corps on a
risky 12 mile march around the Federal army and destroying Hooker's
right in a spectacular surprise attack. Lee pressed his advantage
for three more days and eventually drove the Federals back across the
river.

The first of the classic encounters between Lee and Grant took
place in the dense thickets and tangled over-growth of the Wilderness
on May 5-6, 1864. The Wilderness at this time was a dense forest of
second growth pine and scrub oak, with numerous creeks, gullies, swamps,
heavy tanglefoot underbrush, with few farms or open spaces, and most
of the roads mere winding trails. The Wilderness comprised an area of
about 200 square miles. Today it is still much the same as it existed
in 1864.

In this battle, the two armies sparred indecisively for two days
along the Orange turnpike. On the Plank Road to the south, the Feder-
als almost crushed A. P. Hill's troops on May 5, only to be thrown back
by a dramatic Confederate counterattack the next day. The battle was
tactically a draw. Grant broke the stalemate by marching his army
south toward Spotsylvania Courthouse.

On May 7, 1864, both armies raced for the vital intersection at
Spotsylvania Courthouse which controlled the shortest route to Rich-
mond. Lee arrived first, entrenched, and successfully withstood a ser-
ies of small scale Federal attacks. On the morning of May 12, two Federal
corps charged from the woods opposite a vulnerable section of the
Confederate line known as the mule-shoe salient. Because of a thick
fog and wet Confederate gunpowder, the initial Federal advance over-
whelmed the Southerners. As another assault reached the Confederate
line, Lee's reinforcements crashed into the oncoming Federals and for
the next twenty hours the men in this sector engaged in the most in-
tense hand to hand combat of the war. This desperate fighting at the
"Bloody Angle" earned Lee enough time to build new earthworks which
he defended until Grant abandoned the field on May 21.

BUILDING PROGRAM:
The design of the museum traces the four Fredericksburg battles.
Four major exhibition galleries define the organizational core for
the building's functional relationship. The adjacent Fredericksburg
and Chancellorsville galleries reflect the time sequence of both
battles. Likewise, the adjacent Wilderness and Spotsylvania Cour-
thouse galleries reflect their historical sequence. Space between
each of these two galleries marks the time that elapsed between the
battles, during which the battle of Gettysburg was fought.

Visitors would approach the building from a major highway with
direct access to the interstate highway which runs north and south
through the area. The design of the approach drive and parking areas
serve as attractive introductions for the building.

The location for the museum is situated on a bluff overlooking the
town on the site from which Union General Ambrose E. Burnside planned
and launched his attack in the battle of Fredericksburg on December 12-13, 1862. Adjacent to the museum site is the Chatham Mansion, a building structure in the Georgian style which served as a headquarters for the Federal Command during the battle. I chose this site because I determined that it would be accessible to the major highway (I-95).

The museum building has two levels. The upper level contains the galleries, lobby, auditorium, and orientation spaces. Each of the four galleries has 6400 sq. ft. of floor area. The lobby and orientation areas together comprise 5000 sq. ft. The auditorium can seat 200 people and could be expanded to a larger capacity at some future time.

The lower level of the museum building contains the library, administrative suite, restrooms, storage area, and mechanical rooms. The administrative suite is designed for those who manage the museum. The library is designed for special collections. It contains 6400 sq. ft. of floor area and has space for 12,000 volumes. The storage area has 6400 sq. ft. of floor area and convenient access to the upper level by freight elevator. Outside access to the storage is available through the loading dock which joins the service drive. The mechanical rooms function independently of each other to heat and cool the various parts of the building.
1" Finishing Flooring
- Suspended Plaster Ceiling

Live Load
0.00 lb/ft
Total Floor Load
0.10 lb/ft

Joint Spacing: 4' O.C. 4 = 100 lb = 400 lb/ft (w/ joints)

AISC W6x135 26" = 14,000 lb/ft (exclusive w/ of joint), see

 Beam Design: W 10,000 lb/ft 9 = 144,000 = Total Uniformly

\[ \frac{w_{c}}{d} \]

Distributed Load:

144,000 / 12 = 0.06,000 lb/ft

\[ \frac{w_{o}}{d} \]

Shear: V maximum web shear, kips

\[ \frac{v}{d} \]

Moment:

\[ \frac{M_{x}}{d} \]

Column Design:

\[ \frac{W_{f}}{d} \]

Area:

\[ \frac{A_{x}}{d} \]

Y = Y

12 x 12
6
19.1
19.1
5.2

KBA = 16 x 12 = 190" / 5.02 = 59.00 < 200

KBR = 99.00 - 8 x 17.0

Y = X x K = 19.1 x 19.1 = 352.9 ft

20XK < 352.9 ft (72 X K = 200,000 lb)
**TYPICAL CALCULATIONS - HVAC SYSTEMS**

\[
\begin{align*}
21,375 \times 0.0944 & \times 60 \quad \text{Area - roof} \quad 97,440.0 \quad \text{(Btu/h)} \\
10,625 \times 0.0444 \times 60 \quad \text{Wall} \quad 30,644.0 \\
9,000 \times 0.44 \times 60 \quad \text{Glass} \quad 199,920.0 \\
\text{Volume:} \\
\text{Volume:} \quad \text{wall} x 0.018 \times 60 \quad 793,400.0 \\
\text{Volume:} \quad \text{wall} x 0.014 \times 60 \quad 264,900.0 \\
\text{HL} \quad \frac{(1,211,800.0)}{1.12} \\
\text{Heat gains:} \\
3 \text{ Watts} \times \frac{1}{3} \text{ area} \times 3,014 \\
\left(40,000 \times 0.90 \times 0.18 \right) \times 3,014 = 283,217.0 \\
\text{plus - People:} \quad 900 \times 100 \text{ Btu/hr} = 90,000 \\
1,121,800.0 - \left(283,217.0 \times 0.9 + 90,000 \right) = 738,927.0 \\
\text{400 CFS:} \quad \frac{400}{4,000} \times 60 \\
\text{710,927.0} \times 1.00 \times 50 = 28,000.0 \\
21,375 \times 0.60 \times 15 \quad \text{Air} \quad 12,915.6 \quad \text{(Btu/h)} \\
10,625 \times 0.0444 \times 15 \quad \text{Air} \quad 740.45 \\
9,000 \times 0.34 \times 15 \quad \text{Air} \quad 29,340.0 \\
\text{Volume:} \quad \text{wall} x 0.018 \times 14.0 = 178,545.0 \\
\text{wall} x 0.014 \times 60 \times 0.9 = 803,477.0 \\
\text{Heat gains:} \quad \left(40,000 \times 0.90 \times 0.18 \right) \times 3,014 = 283,217.0 \\
\text{plus - People:} \quad 900 \times 100 \text{ Btu/hr} = 90,000.0 \\
\text{Volume:} \quad 280,963.0 + \left(121,499.32 + 200,000 \right) = 1,009,872.0 \\
\text{400 CFS:} \quad \frac{1,009,872.0}{4,000} \times 60 \times 15 = 283,291.00 \\
\text{LOAD H Btus 4 CFS U RPM PCT (dia) Rectang, eq.} \\
910,997.0 \quad 28,000 \quad 2400 \quad \frac{40}{2} \quad \frac{2\left(80\times 12\right)}{2} \\
1,009,872.0 \quad 283,291.00 \quad 2400 \quad \frac{90}{2} \quad \frac{2\left(80\times 17\right)}{2} \\
\end{align*}
\]
The vita has been removed from the scanned document
ABSTRACT

For many people Fredericksburg is synonymous with the fierce battles of the Civil War, four of which were waged in or near the city. Between 1862 and 1864 nearly three quarters of a million men in two opposing armies fought over the territory near Fredericksburg. The town's strategic location fifty miles either way north and south from the two rival capitals made the entire area a battlefield.

In December 1862, the quiet of this picturesque small town was ended by one of the bloodiest conflicts of the war. The simple stone wall on Sunken Road at the base of Marye's heights became immortalized on those cold winter days of 1862 as 13,000 Federal soldiers were killed or wounded trying, in wave after wave, to capture the impregnable Confederate position behind and above the wall.

Later at the battles of Chancellorsville (1863), the Wilderness (1864) and Spotsylvania Courthouse (1864) the destruction of war continued within earshot of the citizens of Fredericksburg. During these later battles, when the town was under Federal occupation, weary Federal soldiers relaxed on the lawn at Brompton on the same heights for which so many had died in vain in 1862. The combined Federal and Confederate casualties in the four battles near Fredericksburg were over 100,000.

The face of Fredericksburg was changed with the battles of the war. Shell damaged buildings were pulled down and replaced by new structures in the latest styles. Other public and private places were repaired and renovated. Kenmore, the Presbyterian church, and the James Monroe museum are among the many prominent buildings with cannon balls still embedded in their walls. The post civil war years were leaner and growth was much slower. It was this lack of prosperity in the late nineteenth and early twentieth centuries which made possible the survival of so many historical sites. Today's Fredericksburg is blessed with a large storehouse of museum houses, historical artifacts, and a long long memory of the making of the nation.