Design of a
Reinforced Concrete
Theatre

May 1920

E.O. Metofsine
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List of drawings

No. 1. Sections of roof and girder
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The object of this design is not only to show the computations of a reinforced concrete theatre but also briefly to show why each method was adopted.

This thesis consists of an economical design of a reinforced concrete theatre, built according to the specifications of the Boston Building Laws.

It was assumed that the number of spectators to be approximately at 1200, land to cost $10 per sq ft and soil to consist of hardpan.

No special dimensions were specified.

The first design includes a balcony, the second a cost comparison in case no balcony
was used.

Reinforced concrete of various mixtures was used where ever possible, but the use of other materials, in case it was more economical, was not restrained. The building is fireproof through out and thou the particulars of the ornamental details were left out, the approximate dead weight was included in the calculations.

Several pages of explanation character are added, so as to indicate method used and give a possibility, if necessary, of checking the work.
Results.
Reinforced concrete theatre, with a balcony, seating approximately 1200 people, occupying area of 90,000 sq ft, is recommended for construction with given requirements and specifications.
Roof.
The roof consists of girders (steel) and reinforced slabs (concrete). As prevention against condensation and radiation, a suspended ceiling is recommended, consisting of 1:5:12 plaster of hydrated lime, Portland Cement and sand respectively, and metal laths.
The disadvantages are: rusting of latter ones and breaking down of ceiling in case of fire.
Drainage is provided by using well tamped cinder filling for concrete slab and which are covered with a coating of cement mortar about 1" thick upon which roofing is placed.
This method of insulation
permits the use of level roof slabs, which in itself is quite a saving.

The cinders should be porous grade of steam boiler cinders free from refuse or slag, should be wet down thoroughly, then placed on the roof, arranged to the proper slopes and tamped to an even surface. Slope 3% to 1.

Minimum thickness = 3".

Before cinders dry up, a coat of cement mortar 1:3 should be placed on cinders to a depth of 1". The roofing consists of layers of waterproof felt cemented together and to the concrete by coal tar pitch; Or-tin, corrugated iron or copper roofing are frequently used also.
Roof

Span=10'  span (long) = 60'

Live Load/sqft. 40#
Weight susp. ceiling /sqft 10#
Felt and asphalt 5#
Dead Load of 5" slab 62#
" " of cinders av. 50#

or 167 x 10 = 1670 # per ft of length

Girders - try

Stand. Riv Plt Girder
30" x 3/8 web
6" x 4" x 3/4" L's  \( \frac{I}{y} = 723.8 \)
14" x 3/4" - C.Plt's

Dead weight of girder/ft 220
" " " firepr. 150

Total weight/ft of length 2040#
2040 x 60 x 60 x 12 ÷ 8 = 1,100,000"#
1,100,000 ÷ 16,000 = 68.5 - \( \frac{F}{T} \) safe
\( t = \text{for shears} = \frac{2040 \times 30}{30 \times 10,000} = 0.204 \) Safe
Slab. try 5" and
3-6-40 Steelcrete Expanded Mesh

From Handbook Safe L.L. = 157 #
D.W.of slab = \( \frac{62}{219} \) #

For end span 219 x \( \frac{10}{12} \) = 183 #
D.W.of slab = \( \frac{62}{121} \) #
Safe L.L. = 121 #

Total "L.L" (so called) includes all load except D.W.of slab

D.W.of cinders = 50 #
D.W.of felt = 5 #
L.L. on roof = 40
Actual L.L. = 95 #

Hence design safe for all cases regarding the rules given in Handbook.
Sight-lines
The solution of no interference
lines of sight is an important
item in solving the height of
balcony.

Sketch #3 shows these lines
which were drawn approximately
according to the recommendations
given in American Forum V26
by Mr. Wittemore.

Each person must have a clear
view of stage and screen and for
convenience a point A (just be-
low the stage) and point C were
chosen as limits of range of
sight.

The intersection of lines of AB
and CD give the lowest point of
balcony, the slope of floor of
which is governed following
way:-
The clear distance between two seats equals 30", the distance in case staggered seats are used, equals hence 5’. The minimum drop should be 4" or 8\% slope. The slope of orchestra floor should be built according to recommendations of Mr Wittermore which are:

1) follow a parabolic curve with maximum slope 2:10 (Boston Building Laws) or
2) consist of sections tangent in each case to the parabola

For this theatre a simplified construction is recommended shown on sketch No
The maximum angle of the rays of
sight or apparatus with the hori-
zontal plane should never ex-
ceed 25°.

The distance should not exceed
one hundred feet, as this is the ex-
treme limit of economy.

With greater distances the cost
of intensity of light is greatly
increased. The lowest opening
in booth should be at least 7'
above floor of balcony.

The booth generally ac-
commodates three machines:

one stereoptical; two for picture
projection.

The later machines should
have a opening each three and
one half feet above floor,
because this is the general
height of machine

The former machine should have one opening three feet above floor and another four feet and one half.
- Exits -

The number and location of exits should be carefully considered in a design of a theatre.

The requirements of Boston Building Law relating to the width of exits are: twenty inches for every one hundred persons for whom seats are provided; that no balcony exit should be not less than four feet wide, that in case balcony stairs have common outlet with the main entrance, the clear space should be at least one and one half times as wide as the stairs.

The space is measured from lowest run to center axis of exit.
Lobbies, foyers, corridors and passages should be constructed so as to be sufficient to contain the whole number to be accommodated on such floor or gallery in the ratio of one square foot of floor for each person.

All rooms in theatres for the use of persons employed therein shall have passages to at least two independent means of exits.

These requirements were adopted in design
Floor of Orchestra

Lay out smoothly clean sand on surface of excavated site and pour concrete 1:1/2:3 mixture, expansion metal (Steelcrete) and against sliding use Mason safety thread. Slope is given in discussion on sight lines. Thickness of concrete will be 6".
Walls.

16" thick brick walls
height = 42'
wind pressure = 10 \(^{\circ}\)

Max. moment = \(\frac{1}{8} \omega L^2\)

\[ f_{\text{tension}} = \frac{My}{I} = \frac{\frac{1}{16} \omega L^2}{I} = \frac{1}{18} \times \frac{10 \times 42 \times 42 \times 12}{8} \times \frac{8 \times 12}{12 \times 16 \times 16 \times 16} = \]

\[ = 50.5 \text{ #/}\]

intensity of pressure due to weight of brick wall above middle section

\[ = \frac{21 \times 120}{144} = 17.5 \text{ #/}\]

Total intensity = 33.5 \(^{\circ}\)

allowable on mortar = 40 \(^{\circ}\)

O.K.
Stairs.

The building law of the city of Boston provide, that the cut shall not be more than 7 1/2" for stair stringers and that the number of stairs between landings should not exceed 15.

Borders should be rounded with a radius equal to two feet.

Landings should be as wide as aggregate width of stairs.

Railings fixed three feet above floor, leaving clear spacing equal 4 feet. and that no winding or circular stairs shall be permitted.

All stairs eight feet and over in width shall be provided with a central rail three feet above floor.

Formula $\frac{1}{20}WL^2$ was used for beams; $\frac{3}{8}WL^2$ was used for slabs.
c - column

---

\[ \frac{5}{8} " \]
Beam 1-2.

L.L @ 100/" = 200#

assume DL.

= 100#

300#

assume B.M. = \( \frac{1}{10} WL^2 \)

\[ M = \frac{300 \times 10^2 \times 12}{10} = 36,000" \#

\[ S = 300 \times 5 = 1,500" \#

\[ bd^2 = \frac{M}{R} = \frac{36,000}{107.5} = 334 \]

try \( b = 6" \): \( d = \sqrt{\frac{334}{6}} = 7.5" \)

\[ \bar{y} = \frac{7}{8} \times s \times bd = \frac{7}{8} \times 40 \times 7.5 \times 6 = 1570" \#

1570" > 1500" hence safe ag. sh.

\[ A_s = p \times bd = 0.0077 \times 6 \times 7.5 = .35 \]

try \( 2 - \frac{1}{2}" \# \): \( 2 @ .20 = .40 > .35 \) ok.
Beam 3-4.

\[ L.L @ 100' = 9 \times 100 = 900\# \]
\[ D.L (stair\ slab) = 7 \times 150 = 1050\# \]
\[ D.L (slab\ of\ landing) = 2 \times 50 = 100\# \]
\[ D.W (beam) = \frac{200\#}{2250\#} \]

\[ M = \frac{2250 \times 10 \times 10 \times 12}{10} = 272,000'\# \]

\[ b_d^2 = \frac{272,000}{107.5} = 2530 \]

Try \( b = 8'' \)

\[ d = \sqrt{\frac{2530}{8}} = 17.8 \text{ say } 18'' \]

\[ V = \frac{1}{8} \times 40 \times 8 \times 18 = 5040 \]

\[ 5040 < 11250\# \text{ not safe} \]

Use stirrups \( v = \frac{V}{b_d^2} = \frac{11250}{8 \times 18 \times 18} = 89\# \]

\[ s = \frac{10}{2} \left( 1 - \frac{40}{89} \right) = 2.75 \]

Use \( 2-\frac{3}{8}'' \) stirrups

Spacing = \( \frac{3}{2} \times \frac{2 \times .11 \times 16000 \times \frac{7}{18}}{11,250} \]

\[ = 7.4'' \]

Use 6'' and 9'' spacings

| 6'' | 6'' | 9'' | 9'' |

\[ A_s = p bd = .0077 \times 8 \times 18 = 1.11'\]

Try 2-\( \frac{3}{8}'' \) @ .60''
Slab 1-2-3-4.

\[ M = \frac{150 \times 4 \times 4 \times 12}{8} = 3600 \text{ "#} \]

Assume \( d = 3" \)

\[ A_s = \frac{3600}{16,000 \times 3} = 0.075 \]

Try \( \frac{1}{4} " \phi \)

\[ s = \frac{0.049}{0.075} \times 12 = 7.94 \text{ say } 7" \]
Beam 5-6

\[ L.L @ 100^\# = 9 \times 100 = 900^\# \]
\[ D.L (s/t, slab) 7 \times 150 = 1050^\# \]
\[ D.L (s/f, land) \quad 100 \]
\[ D.W \ of \ beam \quad \frac{150}{2200^\#} \]

\[ M = \frac{2200 \times 4 \times 4}{10} \times 12 = 42,200 \text{ in}^4 \]
\[ bd^2 = \frac{42,200}{10.75} = 394 \]

assume \[ b = 6" \]
\[ d = \sqrt{\frac{394}{6}} = \sqrt{66} = 8.1 \text{ say } 8.5 \]
\[ V = \frac{7}{8} \times 40 \times 6 \times 8.5^2 = 1770^\# \times 3 = 5310 \]
\[ 3 \times 1770 > 4400 \]
no stirrups.
Slab 4-11-10-9

Cut 7" thread = 11"

assume D.L + L.L = 250#

Length (Hool and Johnson Handbook provides only horizontal distance) = 13.75

\[ M = \frac{250 \times 13.75 \times 12}{8} = 70,500 \]

assume d = 8"

\[ A_s = \frac{70,500}{16,000 \times 8} = .55 \]

\[ f_c = \frac{70,500 \times 6}{12 \times 64} = 530 \# / \text{ft}^2 \]

Sh.: 250 \times 6.87 = 1720#

Allow: \[ S = \frac{1}{8} \times 40 \times 8 \times 12 = 3360 \text{ O.K.} \]

try: \[ 5/8" @ .30" \]

\[ S = \frac{30}{55} \times 12 = 6" \]
Columns for Stairs

Columns 3 & 4

Load at column = 11,250#
Load of column = 1,200#
" at base of " = 12,450#
12,450 ÷ 400 = 31"  10" x 10"
try 10" x 10" 4-1/2" p= 1/6 ±
fied 2' intervals
same columns for 1 and 2.
Columns 5 and 6.

Par 17 Sect 15 Boston
Building Law provides
for reduction of stresses
in columns, whose un
supported height is
more than 12 times
least gross dimension,
following ratio:

\[
\frac{24 - \frac{b}{d}}{12}
\]

Try 12" sq. column 6-\(\frac{5}{8}\)" bar
1:6 mixture H=17.5

\[
24 - \frac{17.5}{12} = \frac{6.5}{12} = .54
\]

\[
450 \times .54 = 243 \text{# per allowable}
\]

Load at each column=4400
" at base of" = 6900

\[
6900 \div 443 = 15.6
\]

Use 12"x12" because limited
by least dimension.
Footing for Stair Columns

For such small columns, practice for footings shows that a footing as follows is safe, as direct load does not exceed 14,000 lb at base.

Steel can be added against cracking.
Columns

Try reinforced concrete columns for roof girders

H = 50', Wind = 10%, Span = 10'

Central Load = 62,000#

Weight of Col. = 47,000#

\[ M = \frac{wL^2}{2} = \frac{100 \times 50 \times 50 \times 12^2}{2 \times 12} = \]

\[ p_0 = 1\% + 1\% = 2\% \]

\[ x_0 = \frac{M}{P} = \frac{150,000}{109,000} = 13.8'' \]

\[ \frac{x_0}{t} = \frac{13.8}{27} = .512 \]

\[ \frac{d_f}{t} = \frac{2}{27} = .74 \text{ use } 0.7 \]

From diagram 11, Hool and Johnson H. B.

\[ k = .69 \]

From diagram 14 for \( k = .0253 \) and \( k = .69 \)

\[ L = .172 \]

\[ f_c = \frac{1,500,000}{.172 \times 27 \times 27 \times 27} = 440 \text{ #/ft}^2 \]
Using \( \frac{24 - \frac{h}{3}}{12} \)

\[ \therefore \frac{24 - 20}{12} = \frac{24 - 20}{12} = \frac{4}{12} = \frac{1}{3} \]

\[ 450\sqrt{\frac{1}{3}} = 300 \text{ ft}^2 \]

\[ 440 - 300 \text{ ft}^2 \]

as reinforced concrete columns of 50' height are usually avoided, and increase of least dimension would be uneconomical, hence try steel columns.

Try steel column:

- 14\%Web Plate
- 6\% Web Plate (four)
- 14\% cover Plates (two)

Total area 30.19 ft²

\[ \text{I axis A} = 1261, \text{ radius A} = 6.46 \]
Steel Columns (Cont)

Adopt column of 4 angles and plates:

\( r = 6.46 \)
\( \frac{L}{r} = \frac{48 \times 10}{6.46} = 18 \)

Allowable stress per sq inch = 16,000 psi.

Roof girder should be connected according to standard beam connections as given for 27" web. Carnegie Rock. Book.

The nos of rivets required in single shear = \( \frac{60120}{6010} = 10 + \), safe...

Eccentricity = 7.3"

Moment = \( 60120 \times 7.3 = 440,000 \)"

\( f_b = \frac{M_y}{I - \frac{P L^2}{I D E}} = \frac{440,000 \times 7.3}{1261 - \frac{60120 \times 42 \times 42 \times 12}{10 \times 30,000,000 \text{ negligible}}} = 2540 \) psi

\( f_d = \frac{P}{A} = \frac{60120}{30.19} = 2000 \) psi

Total = 4540 psi... Allowable 18,000 psi.

Hence safe.

A more economical redesign will not be considered as wind was neglected.
Bearing Plates
Where reinforced concrete column are used.

Table in Ketchum's Structural Engineer's Handbook requires minimum end bearing for 27" (depth) beam 27.1" long hence for this case adopt a plate the length of column = 30".
The breadth = 14" = width of cover Plate = 30" hence 30 x 14 = 420 sq"

\[
\frac{60120}{420} = 142 \frac{2}{3} \text{" allowable} \\
400 \text{"} \\
0.06 \text{" thickness of bearing plate} 1"
\]
Balcony

Slab

Span 10'
Live Load 100#/ft = 100#
Weight Slab 75#/ft
Weight of steps, chair etc 100
275#

Moment = \( \frac{1}{8} wb^2 \)
= \( \frac{1}{8} \times 275 \times 10^2 = 3450 \) #
= 414000##

\( d = \sqrt{\frac{414000}{107.5 \times 12}} = \sqrt{32.2} = 5.66 \)

use 6 1/2" slab

\( A_s = 0.0077 \times 12 \times 5.66 = 0.522 \)"

use 1/2" @ .196"

\( s = \frac{0.196}{0.522} \times 12 = 4.5 \)

Weight of steps and chair can be
Taken as equal to 80#
as step on average 3" and weight of chair = 20#
Balcony Girder
Span 60' to c Tee beam

L.L @ 100# 1000#/ft
DL of slab + steps 1450#/ft
DL of beam \( \frac{700}{3150} \)#/ft

End Shear = 94500#
Max. Mem = \( \frac{1 \times 3150 \times 60 \times 60}{72} \) = 11, 300, 000 #

\( bcl = \frac{94500}{120 \times 0.875} = 900 \text{ in} \)
\( b = 19" \quad d = 47.5" \)

As app. but safe = \( \frac{M}{f_s(d - \frac{1}{2}t)} = \)

\( = \frac{11,300,000}{16000 (47.5 - 3.25)} = 16 \text{ in} \)

Use 4 rods size 1/8@ 1266"

required 13 rods.

Use cold twisted square bars to increase bound stress
Balcony Girder (Cont.)

Shear:

\[ \frac{V}{bd} = \frac{3150 \times 30}{18 \times \frac{7}{8} \times 47.5} = 120 \text{ ft}^-2 \]

Max. diam. of stirrup:

\[ i = 2.4 \frac{80}{16000} \times 47.5 = 0.56'' \]

use prong . . . diam can be increased.

for given size of girder \( \frac{1}{2}'' \) stirrups are recommended.

End spacing:

\[ s = \frac{8 - 3}{2} \frac{4 \times 196 \times 16000 \times \frac{7}{8} \times 47.5}{3150 \times 30} = 8.3'' \]

use 6''

Stirrups are not needed at a distance from support equal

\[ x_1 = \frac{60}{2} (1 - \frac{40}{120}) = 21'' \]

Number of bars that can be bent up

\[ N = \frac{3150 \times 30}{\frac{7}{8} \times 47.5 \times 80 \times 1.264} = 5.2 \]

say 5 rods
Investigation of Compression in Flange

\[
\frac{M}{bd^2} = \frac{11,300,000}{78 \times 47.5 \times 47.5} = 65
\]

\[
\frac{t}{d} = \frac{6.5}{47.5} = .137
\]

We diagram for Tee beams

\[f_c = 580 \text{ psi} \quad \text{O.K.}\]

This shows that concrete stress is below a condition often met with tee beam design.
negative bending moment =
\[ \frac{1}{16} WL^2 = \frac{12}{16} \times 11,300,000 = 8,500,000'' \#
\]
\[ f_c = 750 \, \text{psi} \quad R = 134 \quad f_c = 16,000 \quad k = 4.15 \]

Moment @ support girder will carry:
\[ = 134 \times 19 \times 47.5^2 = 5,765,000'' \#
\]
Excess of moment = 2,735,000''

CG of bars 4'' up from bottom
\[ k_d = 4.15 \times 47.5 = 17.6 \]
\[ f_c @ CG = \frac{13.6}{17.6} \times 750 \times 15 = 8.700' \%
\]

As required Compr. face =
\[ = \frac{2,735,000}{43.5 \times 8700} = 7.25'' \#
\]

As in tensionface =
\[ = \frac{5,765,000}{16,000 \times 4.75 \times \frac{7}{8}} + \frac{2,735,000}{16,000 \times 43.5} \]
\[ = 8.66 + 3.94 = 12.6'' \]

or \[ A_5 = pbd + 7.25 \times \frac{8.7}{16} = 12.9'' \]
1. Bend up 3 bars at point:
   \[ x_1 = 60 \sqrt{\frac{2}{12} \cdot \frac{1.266 \times 3}{16.5}} = 11.8' \]

2. Bend up 2 more bars at point:
   \[ x_2 = 60 \sqrt{\frac{2}{12} \cdot \frac{1.266 \times 5}{16.5}} = 15.0' \]

3. Bend up 2 more bars at point:
   \[ x_3 = 60 \sqrt{\frac{2}{12} \cdot \frac{1.266 \times 7}{16.5}} = 18.0' \]
Columns for Balcony Girders

Roof Load = 60120 #
D.W of column ass. @ 2000/#ft = 80,000 # app.
D.W of girder = 94,500
234,620 #

Bending moment due to wind can be neglected as it is only 10%.
Assuming walls to absorb it.
Bending moment due to balcony girder = 8, 500, 000 #
Use Hool and Johnson diagrams

1:1\frac{1}{2}:3 2500# concrete $n=12$

1% spiral $f_c = 870$#

Column

$x_o = \frac{8500,000}{234.620} = 36.4$

$t = 30^\circ$

$\frac{x_o}{t} = \frac{36.4}{30} = 1.2$

$b = 66^\circ$

$P_o = 1.5\%$

$\frac{x_o}{t} = 1.2$

$d' = 0.05t$

$K = 0.39$

use 40 - 1" bars vert. reinf.

$P_o = \frac{15}{79} = 0.190$

hooping = pitch 2"

$L = 166$

$2600 \times 12 \times 0.01 = 6 \times 250 \times A$

$A = 0.2^\circ$ use $\frac{1}{2}"$ hooping
Footings for Reinforced Concrete Columns

Footings shall be made of reinforce concrete, with the reinforcement at bottom only consisting of two sets of bars placed at right angles to each other and parallel with sides of the footing.

The allowable capacity (bearing) of soil is $10^{7/6}' = 140^\circ$

Load at base of column = 234,620#

\[
\frac{234,620\phi}{227\phi} = 103^\circ
\]

O.K.
Built steel Column Base

Following base was adopted:

1:2 Cement Mortar between all bearings

5 3/8 bars

Cement Concrete 1:2:4
Cost of construction

A rough estimate of each construction was made. The main feature of these computations is to show relatively which method is more economical. The figures are taken from Hoole and Johnson Handbook and Ketchum's handbook hence give the possibility of estimating only relatively and no actually.
Cost of construction with balcony

Roof girders 1.55 x 196 x 63 x 15  $2870.00
Steel columns 1.60 x 30.15 x 22 x 42 x 34  $1500.00
Cost of erection @ 70c
Rivets, bases etc  $1120.00
$1000.00
Cost of Concrete.

Balcony Columns:
\[4 \times 2 \times 6 \times 3 \times 108 \times 9.13 \div 27 \times 2.57\]
= \$2016.00

Auditorium Floor
\[150 \times 60 \times \frac{1}{2} \times 9.13 \div 27 = \]
= \$1520.00

Surface Finish of Roof
\[150 \times 60 \times 5.11\]
= \$450.00

Roof Slab
\[\frac{1}{2} \times 150 \times 60 \times 9.13 \div 27 = \]
= \$1520.00

Balcony Girders
\[2 \times 4 \times 60 \times 9.13 \times 4 \div 27\]
= \$650.00

Balcony Slab
\[30 \times 60 \times 1200 \times \frac{1}{2} \div 27\]
= \$400.00

Stairs.
\[10 \times 15 \times 9.13 \div 27\]
= \$51.00
\[4 \times 4 \times 4 \times 9.13 \div 27\]
= \$21.00
\[4 \times 1 \times 4 \times 9.13 \div 27\]
= \$5.00

Foundations
\[10 \times 2.5 \times 2.5 \times 1 \times 9.13 \div 27\]
= \$21.00

Seats Foundation
\[850 \times .50\]
= \$400.00
Balcony reinforcement

$60 \times 4 \times 4.00 \times 16 \times 3.4$

$21 \times 2 \times 4 \times 2 \times 3.4 \times 4 \times 4.00$

$2 \times 3 \times 30 \times 60 \times 3.4 \times 4.00$

Total: $528.00$

$196.00$

$45.00$

$205.00$

$900.00$

Column reinforcement

$45 \times 42 \times 3.4 \times 4.00 \times 8$

Steel for base

$205.00$

$900.00$
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation 16 x 180 x 60 x 0.3 \div 27</td>
<td>$1630.00</td>
</tr>
<tr>
<td>Land = 150 x 80 x 10</td>
<td>$120,000.00</td>
</tr>
<tr>
<td>Form work</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>Extras</td>
<td>$3,000.00</td>
</tr>
<tr>
<td>Brick work 150 x 40 x 2.25 x 8 x 125 = 13,500.00</td>
<td></td>
</tr>
<tr>
<td>Roofing 150 x 60 x 50</td>
<td>$4,500.00</td>
</tr>
</tbody>
</table>

Total: $161,700.00
Cost of theatre with no balcony

Excavation

£ 2010.00

Land = 180 x 80 x 10

£ 134,000.00

Roof girders = 196 x 18 x 15.5 x 63 =

£ 3,400.00

Steel columns = 34 x 30 x 1.6 x 30 x 34 =

£ 1,680.00

Brick work 180 x 30 x 1.25 x 8 x 2 x 12 =

£ 4,400.00

Riviting, bases etc

£ 1,000.00

Auditorium floor 180 x 60 x 1/2 x 9.13 ÷ 27 =

£ 1,840.00

Surface finish

£ 540.00

Seats foundation

£ 400.00

Extras

£ 3,000.00

Form work

£ 1,600.00

Roofing 180 x 60 x 150 ÷ 3

£ 5,480.00

£ 179,420.00

app
Proscenium wall, stage decoration, toilets, stage rooms, details of exits, construction and other ornamental finish of the building are omitted, as they should be designed by a competent architect.

Provisions to make possible for the architect to carry out successfully these details were constantly carried in mind and it is hoped there would be little difficulty in final design of ornamental finish of the building.
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6. American Forum 1926