**FULL-SCALE WIND TUNNEL**

**Use:**
For investigation of aerodynamic characteristics and behavior of full-size airplanes.

**Authority:**
70th Congress, Public No. 778; approved February 20, 1929.

**Location:**
Plex 22, Langley Field, Va.; approved by Secretary of War July 24, 1929.

**History:**
Preliminary work on full-scale wind tunnel started April 27, 1929. Full-scale wind tunnel placed in operation May 27, 1931.

**Construction:**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Main Building</th>
<th>Hangar Extension</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions of building</td>
<td>435' × 222' × 82' (av. height)</td>
<td>74' × 62' × 28' (av. height)</td>
<td></td>
</tr>
<tr>
<td>Ground area occupied</td>
<td>104,000 sq ft</td>
<td>4,700 sq ft</td>
<td>108,700 sq ft</td>
</tr>
<tr>
<td>Ground floor area</td>
<td>96,500 sq ft</td>
<td>4,500 sq ft</td>
<td>101,000 sq ft</td>
</tr>
<tr>
<td>Cubic contents</td>
<td>7,900,000 cu ft</td>
<td>128,000 cu ft</td>
<td>8,028,000 cu ft</td>
</tr>
</tbody>
</table>

**Character**
Steel structure - Careystone covering

**Type and thickness of walls**
Corrugated Careystone - 5/16 in. thick

**Type and thickness of floor**
Concrete - 5 in. thick

**Type of roof**
Corrugated Careystone

**Cost Summary**

| Cost of full-scale wind tunnel building | $958,932.03 |
| Cost per cu ft                          | 0.119       |
| Cost of full-scale wind tunnel equipment | 157,684.57 |
Detailed Costs

Structure
  Preliminary studies; design; model tunnel; clearing and grading site; inspection and other personal service, etc. $ 67,758.95

  Construction, including hangar annex 473,032.48

Electrical equipment; 2 G.E. 4,000 hp motors; 2 propeller fans, each consisting of 4 blades 35' 5" in diameter; lighting system, etc. 178,858.68

Mechanical equipment, balance, survey apparatus, etc. 132,479.83

Heating and plumbing systems, etc. 19,626.45 $ 871,756.39

Technical and engineering services (10 o/o of structure and tunnel costs - $871,756.39) 87,175.64 958,932.03

24" Smoke Tunnel 8,770.32

  Inventoried mechanical equipment 40,556.77

  Inventoried instruments 4,385.32

  Inventoried furniture 8,892.57

  Inventoried electrical equipment 11,709.12

  Inventoried fire-fighting equipment 550.00

Models for research use (estimated and inventory cost of those currently on hand) 63,537.56

Additional services and equipment charged to P.J.O. 92 - Full-Scale Wind Tunnel - Equipment and Alteration 19,282.91 157,684.57

Total to June 30, 1942 $1,116,616.60
June 30, 1942

Main Contractors

Structure: Contract NAw-80, dated February 12, 1930, J. A. Jones Construction Co., Charlotte, N. C. Started March 8, 1930; completed December 19, 1930 - $400,458.46


Balance scale assembly: Contract NAw-118, dated November 19, 1930, Toledo Scale Co., Toledo, Ohio. Started November 29, 1930; completed April 3, 1931 - $16,700.00

Hangar extension: Contract NAw-149, dated June 17, 1931, Southeastern Construction Co., Charlotte, N. C. Started June 29, 1931; completed September 17, 1931 - $10,077.50

Modifications to balance: Order No. 1552, dated February 15, 1938, Norfolk Navy Yard, Portsmouth, Va. Completed March 9, 1939 - $29,702.07
FULL-SCALE WIND TUNNEL

Use of structure - for investigation of aerodynamic characteristics and behavior of full-sized airplanes.

Authority - 70th Congress, Public No. 778, Approved February 20, 1929.

Location - Plot 22, Langley Field, Va.; Approved by Secretary of War July 24, 1929.

Preliminary work on full-scale wind tunnel started April 27, 1929.

Main contractors -

Structure: Contract NAw-80, dated February 12, 1930, J. A. Jones Construction Co., Charlotte, N. C.

Started March 8, 1930; completed December 19, 1930 - $400,458.46


Started June 23, 1930; completed February 24, 1931 - $145,239.00

Balance scale assembly: Contract NAw-118, dated November 19, 1930, Toledo Scale Co., Toledo, Ohio.

Started November 29, 1930; completed April 3, 1931 - $16,700.00

Hangar extension: Contract NAw-149, dated June 17, 1931, Southeastern Construction Co., Charlotte, N. C.

Started June 29, 1931; completed September 17, 1931 - $10,077.50


Completed March 9, 1939 - $29,702.07

Full-scale wind tunnel placed in operation May 27, 1931.

<table>
<thead>
<tr>
<th>Main Building</th>
<th>Hangar Extension</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions of building - 435' x 222' x 82' (av. height)</td>
<td>74' x 62' x 28' (av. height)</td>
<td></td>
</tr>
<tr>
<td>Ground area occupied -</td>
<td>104,000 sq.ft.</td>
<td>4,700 sq.ft.</td>
</tr>
<tr>
<td>Ground floor area -</td>
<td>96,500 sq.ft.</td>
<td>4,500 sq.ft.</td>
</tr>
<tr>
<td>Cubic contents -</td>
<td>7,900,000 cu.ft.</td>
<td>128,000 cu.ft.</td>
</tr>
<tr>
<td>Character -</td>
<td>Steel structure - Careystone covering</td>
<td></td>
</tr>
<tr>
<td>Type and thickness of walls -</td>
<td>Corrugated Careystone - 5/16 in. thick</td>
<td></td>
</tr>
<tr>
<td>Type and thickness of floor -</td>
<td>Concrete - 5 in. thick</td>
<td></td>
</tr>
<tr>
<td>Type of roof -</td>
<td>Corrugated Careystone</td>
<td></td>
</tr>
</tbody>
</table>
FULL-SCALE WIND TUNNEL

June 30, 1939

Cost of full-scale tunnel building - $731,704.67
Cost per cu. ft. - $0.09
Cost of full-scale tunnel equipment - $253,805.97

Detailed Costs of Tunnel and Equipment

Structure -
Preliminary studies; design; model tunnel; clearing and grading site; inspection and other personal services, etc. $67,248.86 67,758.95

Structure -
Construction, including hangar annex 473,032.48

Electrical equipment; 2 G.E. 4,000 h.p. motors; 2 propeller fans, each consisting of 1/4 blades 35' 5" in diameter; lighting system, etc. 178,852.68 132,074.13

Mechanical equipment, balance, survey apparatus, etc. 130,960.67

Heating and plumbing systems, etc., including inventoried firefighting equipment 12,564.65

Technical and engineering services (10% of structure and tunnel costs - $852,605.34) 864,288.89

Inventoried mechanical equipment 7,790.54
Inventoried electrical equipment 6,743.81
Inventoried furniture and office equipment 10,421.47
Inventoried drafting equipment 9,111.76
Inventoried scientific equipment 4,049.28

Models for research use (estimated cost of those currently on hand) 87,619.20

Additional services and equipment charged to P.J.O. 92 - Full-Scale Wind Tunnel - Equipment and Alteration 12,934.96 11,336.87

Total to June 30, 1939 1,071,771.17 1,105,182.84

October 5, 1939