

TWO-DIMENSIONAL TUNNEL

Use: To give reliable data on airfoils as applied in flight at large Reynolds numbers - Aeronautical research models mounted in jet of compressed air at pressures varying from one to ten atmospheres.

Authority: Independent Offices Appropriation Act 1939; approved May 23, 1938.
Act 1940; approved March 16, 1939.
(Limit on construction cost \$440,000.00)

Location: Plot 19, Langley Field, Va.; approved by Secretary of War October 22, 1938.

History: Preliminary work on two-dimensional tunnel started February 1, 1938.
Two-dimensional tunnel was placed in operation May 1, 1941.

Construction:

	<u>Tunnel</u>	<u>Office, Shop, Motor Bldg.</u>
Dimensions of building	145' long x 58' wide	115' long; max. width 77', min. width 114', aver. width 27'
Ground area	8,400 sq ft	3,105 sq ft
Second floor area		2,145 sq ft
Cubic contents		71,350 cu ft
Character	Steel structure	Brick with gravel and felt roof
Type and thickness of walls	Steel (3/4" to 2" thick)	Brick 12 1/2" thick (plaster on first floor in addition to brick)
Type and thickness of floor	Steel	1st floor 5" concrete; 2nd floor 25/32" maple on 1-1/32" yellow pine subfloor
Type of roof	Steel	1" insulation, covered with 5 ply saturated felt covered with gravel

Cost Summary

Cost of two-dimensional tunnel	\$540,104.48
Cost of two-dimensional tunnel equipment	71,840.02

	<u>Detailed Costs</u>	
Design	\$ 30,669.12	
Structure, including tunnel	<u>269,068.89</u>	\$298,738.01
Built-in mechanical equipment	121,260.98	
Built-in electrical equipment	<u>70,005.08</u>	<u>191,266.06</u>
		491,004.07
Technical and engineering services (10 % of structural costs)		<u>49,100.41</u>
		540,104.48
Inventoried mechanical equipment	31,911.92	.
Inventoried instruments	3,547.09	
Inventoried furniture	7,051.99	
Inventoried electric equipment	7,543.42	
Inventoried fire-fighting equipment	383.00	
Models for research use	11,537.97	
Additional services and equipment charged to P.J.O. 72 - Airflow Research Equipment and Alterations, and to P.J.O. 95 - Two- Dimensional Tunnel Equipment and Alterations	<u>9,864.63</u>	<u>71,840.02</u>
Total to June 30, 1942		611,944.50

Main Contractors

Shop office and motor building: Contract NAW-709, C. C. Vellines, Newport News, Va. Started January 9, 1940; completed July 26, 1940 \$50,695.00

June 30, 1942

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Tunnel structure: Contract NAW-606, Pittsburg-Des Moines Steel Co. Started February 22, 1938; completed July 3, 1940 \$232,858.00

Fabrication and erection of the propeller drive: Contract NAW-659, Whaley Engineering Corp., Norfolk, Va. Started July 24, 1939; completed November 11, 1940 \$51,349.00

Drive motor: Contract NAW-684, Westinghouse Electric and Manufacturing Co. Started October 22, 1939; completed January 10, 1941 \$73,011.00

Substation: Contract NAW-791, H. M. Wood Co. Started April 9, 1940; completed June 24, 1940 \$2,785.00

Rectifier units: Contract NAW-815, Ward Leonard Electric Co. Started June 10, 1940; completed August 7, 1940 \$3,992.00

Motor generator set: Contract NAW-816, General Electric Co. Started June 13, 1940; completed November 19, 1940 \$9,834.00