

APPENDIX I.

A NEGLECTED CONSIDERATION IN HIGHWAY-BRIDGE DESIGNING.

SPECIFICATIONS for highway-bridges generally call for strength to resist a wind pressure of at least thirty pounds per square foot of exposed surface ; but there are many such structures in the United States whose trusses would not, unaided, withstand this pressure. Granting that the lateral rods are large enough, that the upper lateral and portal struts have sufficient strength to resist both direct thrust and bending, and even that the lower lateral rod connection is all that could be desired, still the bridge may be far from fulfilling the requirements, as the following investigation will show :—

Let

p = the assumed pressure per square foot,

and

A = the area in square feet per lineal foot of the vertical projection of that part of the structure lying below a horizontal plane, which passes midway between the chords of a through Pratt-truss bridge (the windward truss and hand-rail are not supposed to shelter the leeward ones) ;

then

$pA = W$ = wind load per lineal foot for the lower lateral system when the bridge is empty.

Let

A_1 = the total area of bridge per lineal foot exposed to the wind pressure,

h = the vertical distance of the centre of pressure above the level of the bed-plate,

l = the panel length,