

PROGRESSIVE COLLAPSE OF STEEL TRUSS BRIDGES, THE CASE OF I-35W COLLAPSE

Abolhassan Astaneh-Asl^a

^a *University of California, Berkeley, USA*

Abstract: Steel deck truss bridges, being determinate systems and not having redundancy, can progressively collapse over the entire span, if a single primary member or gusset plate connection of the main trusses fails. One of the recent tragic examples of such progressive collapse of the entire bridge due to loss of a single gusset plate is the case of I-35W steel deck truss bridge located in the city of Minneapolis in United States which collapsed entirely on August 1, 2007 resulting in deaths of 13 people and injury to more than 100 others. This paper presents a summary of the structure of the bridge, the condition of the bridge prior to collapse, a likely scenario for its progressive collapse and provides lessons learned and design recommendation in the conclusion section. The recommendations can be used in design of new and in the retrofit of existing steel truss bridges to mitigate this serious life safety hazard.

1. INTRODUCTION

On August 1, 2007 at 6:05PM, in a relatively warm evening, the 40 years old I-35W steel deck truss bridge over the Mississippi River in Minneapolis, Fig. 1, suddenly and without almost any noticeable warning collapsed entirely into the river, Fig. 2, causing the deaths of 13 people and injury to more than 100 others who were crossing the bridge in their vehicles at the time of the collapse.



Fig. 1: A view of the I-35W bridge looking northeast