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## Overview

This research is aimed at answering two questions:

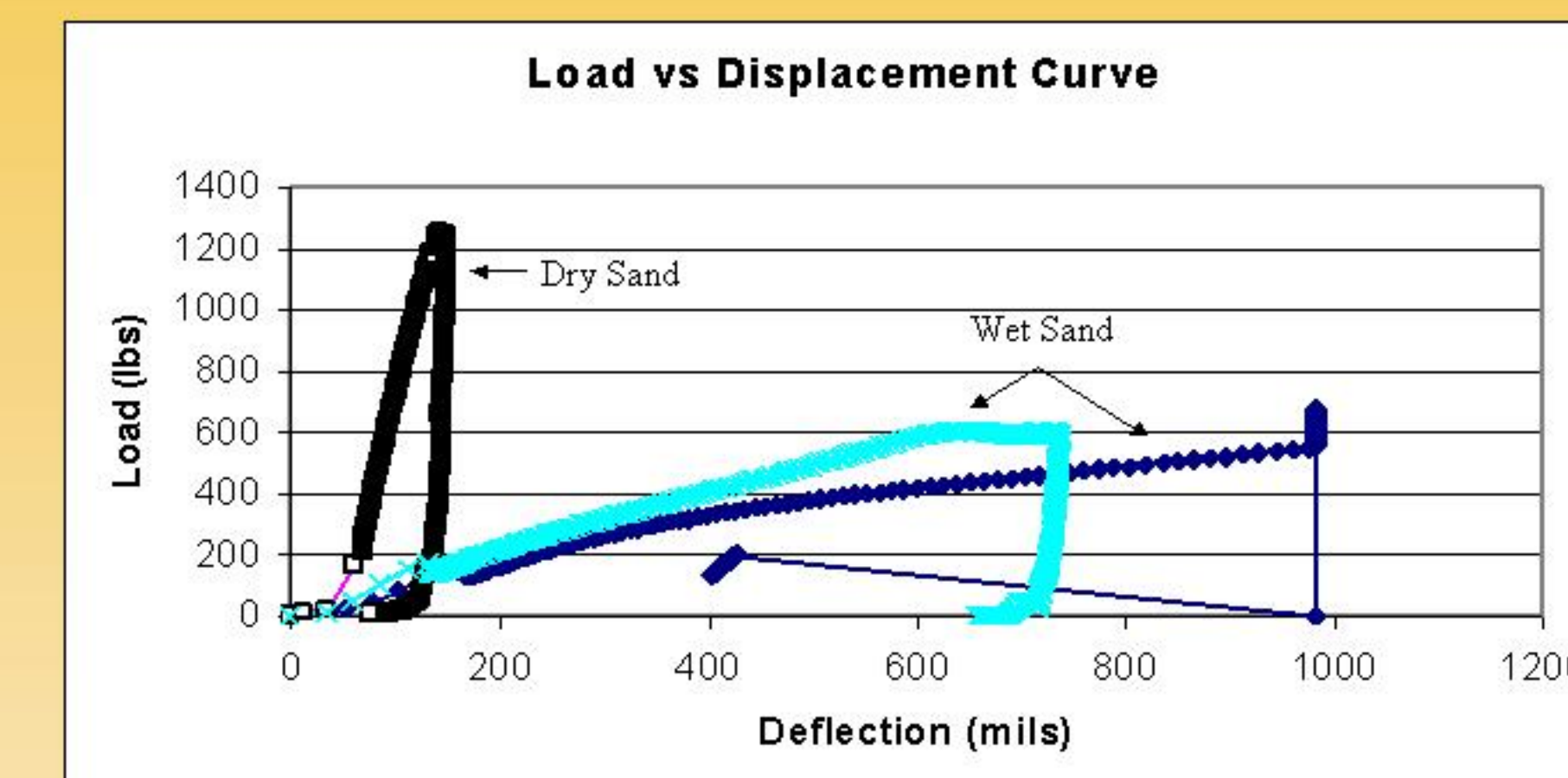
1. What is the maximum depth at which a mine can detect a vehicle?
2. What is the maximum depth at which a mine can damage a vehicle, i.e. the load a mine puts on a vehicle?

## Static Pressure Test Equipment and Setup

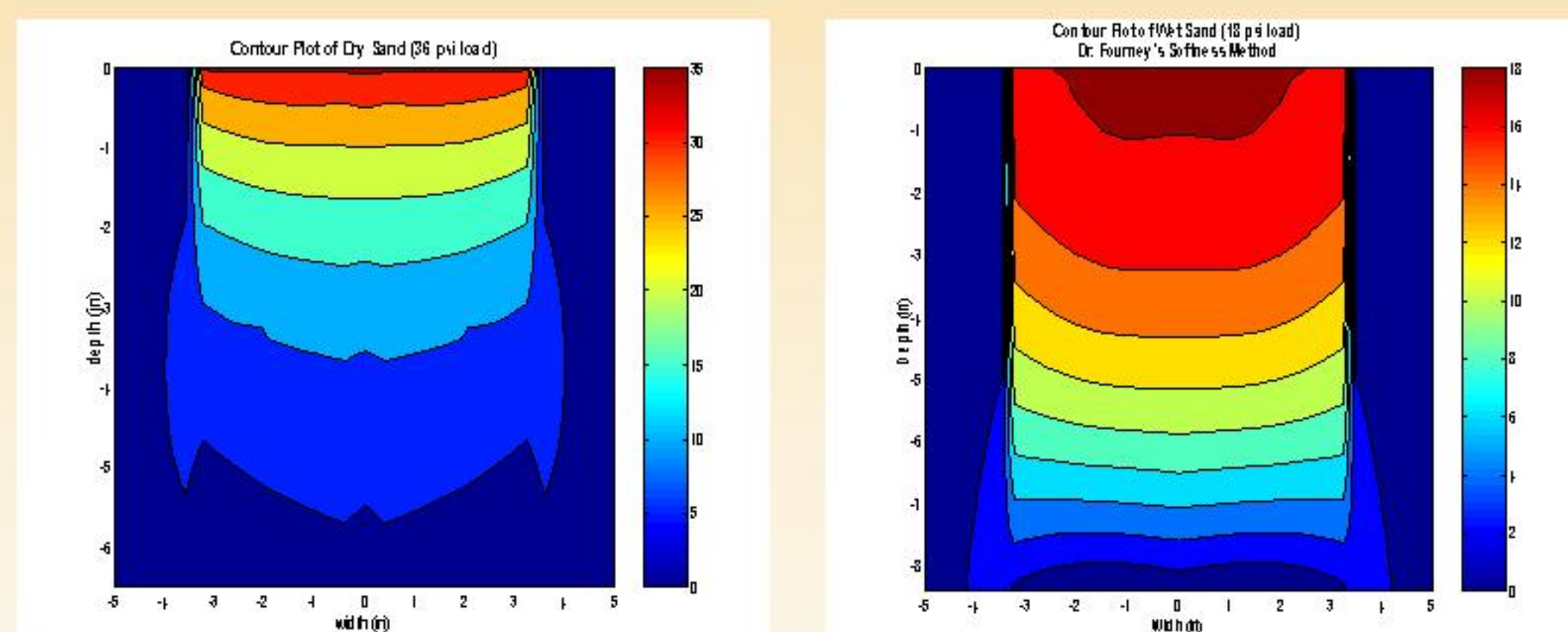


Pressure Gages

## Static Pressure Test Results



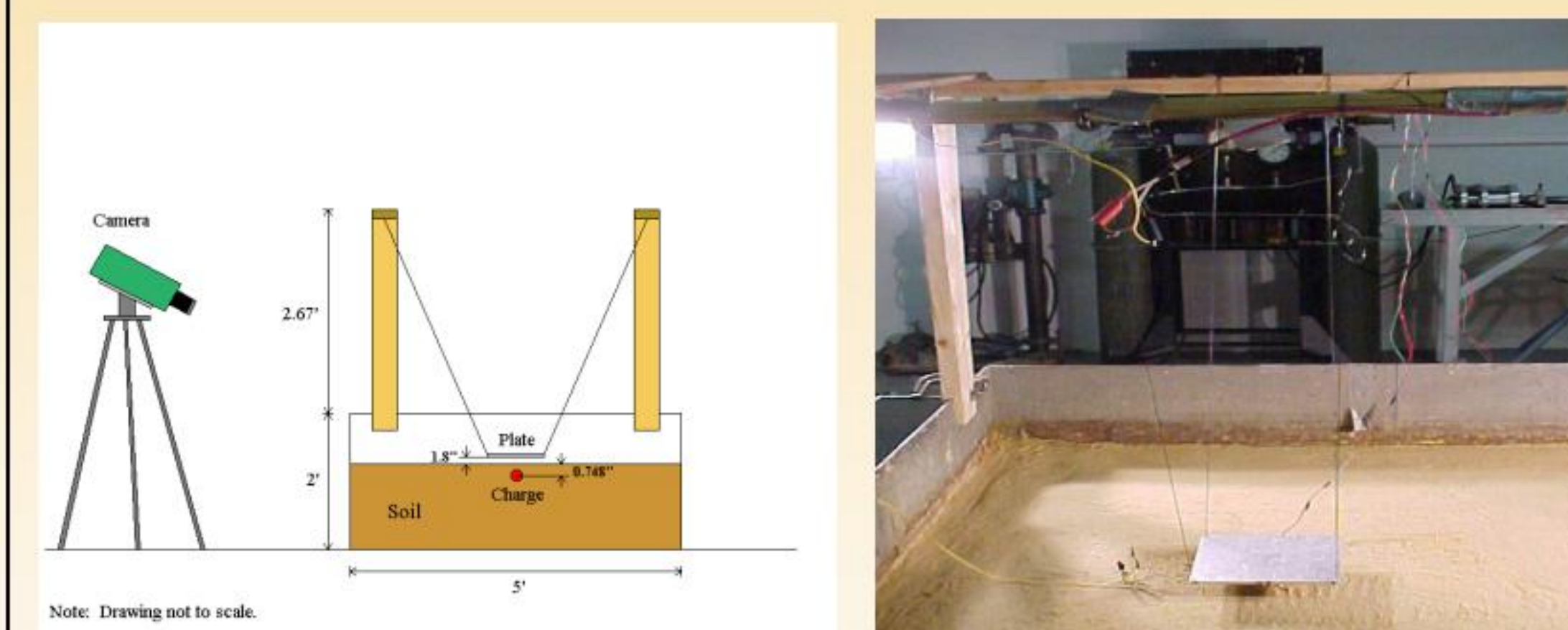
## Static Pressure Contours in Dry/Wet Sand



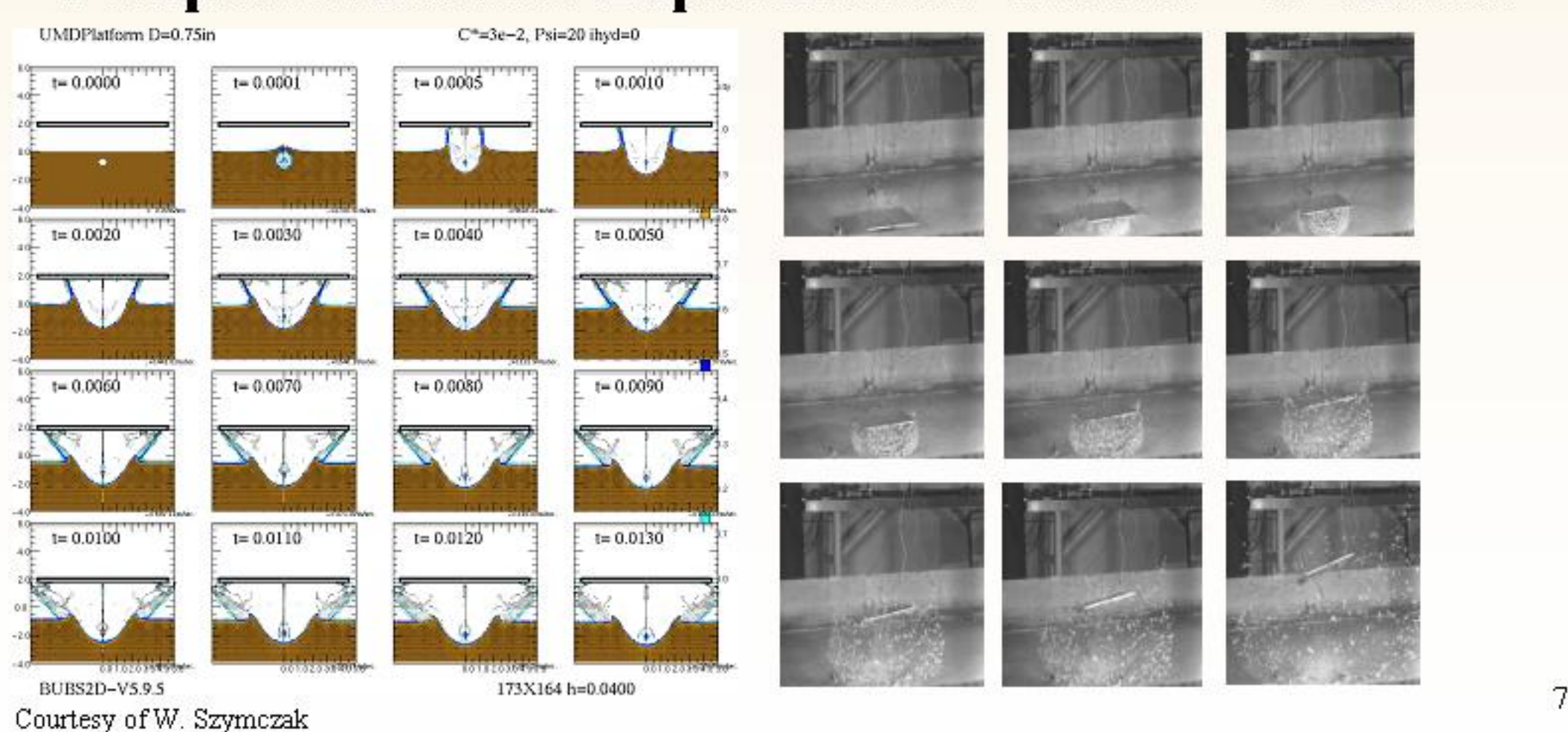
## Static Pressure Test Explanation

The test setup seen above consisted of a steel container of sand with pressure gages placed at various depths. The sand was compressed using a SATEC compression machine and the pressure, load, and displacement of the sand were recorded with a data acquisition system. The load vs. displacement curves shown are for both dry and wet sand tests. From these results it can be seen that the saturation level of the sand can be determined from the slope of the load displacement curve. This is an important finding since the pressure contours show that the same pressure is transmitted to greater depths in wet sand than in dry, therefore making it critical to know the saturation level of the sand.

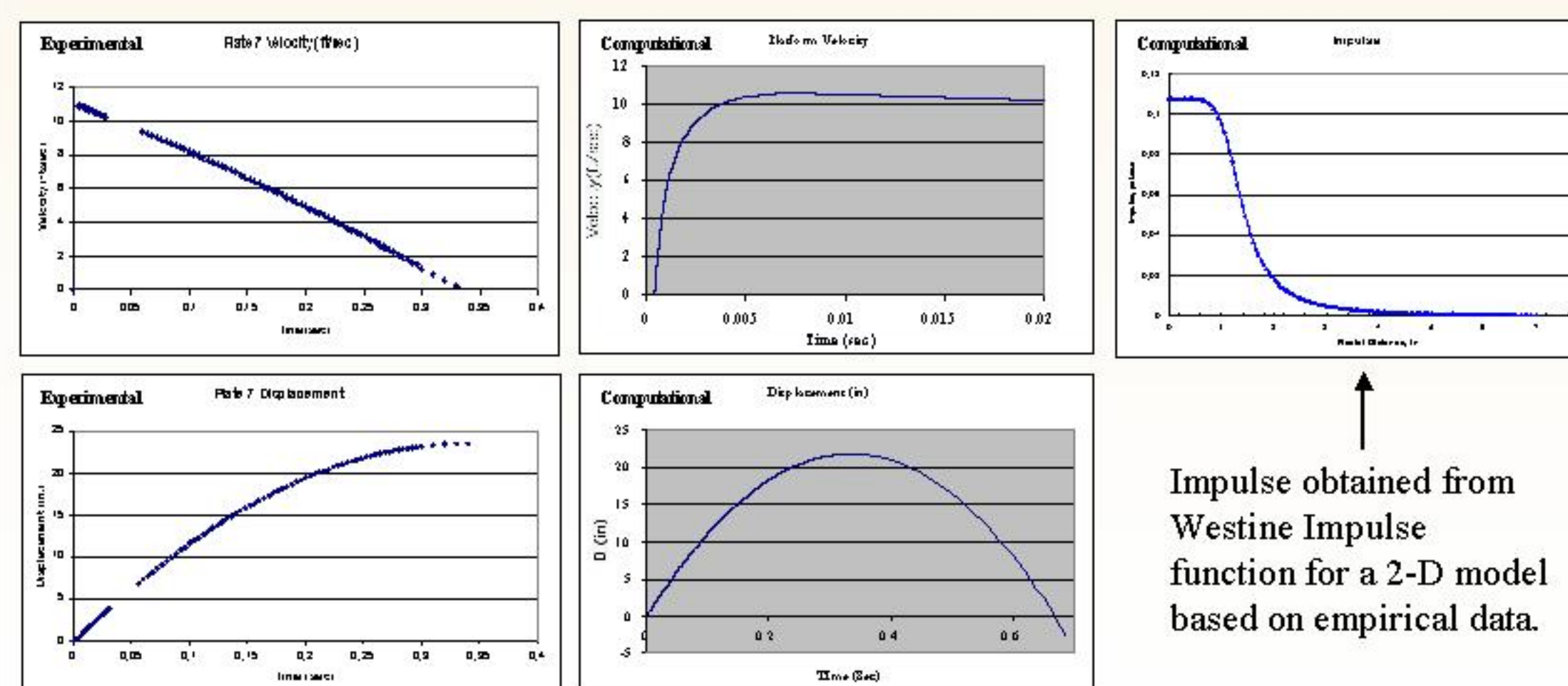
## Vehicle Loading Due to Mine Test Setup



## Computational and Experimental "Movies" of Results



## Experimental vs. Computational Results



## Vehicle Loading Due to Mine Test Explanation

The test setup seen above uses an aluminum plate to simulate a Navy LCAC (hovercraft) vehicle above a saturated soil surface with an explosive charge (mine) buried below it. The charge is detonated and a movie of the event is taken with a high speed digital camera. From this movie the displacement of the plate is measured and recorded along with the plate's velocity. A computational analysis of the same event is performed by the Navy and used for comparison of the results for initial velocity and maximum height of the plate with experiment. The computational results shown compare very well with experiment for the given test conditions. The total impulse imparted to the plate from the explosive is obtained as well so as to provide the Navy with data for the loading on the vehicle for various charge depths and water heights.