

# Development of an Alternative for the External Means of Initiation for Hazard Classification of Rocket Motors



**Weapons Division**

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# Report Documentation Page

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# Purpose

- **Rewrite of TB 700-2 requires**
  - **Single Package Test**
    - **Sympathetic Reaction Test if expected outside reactions**
- **Large Diameter Rocket Motors**
  - **Not transported or stored in stack configuration**
  - **Alternate Test Used**
    - **Super Large Scale Gap Test**



# Background

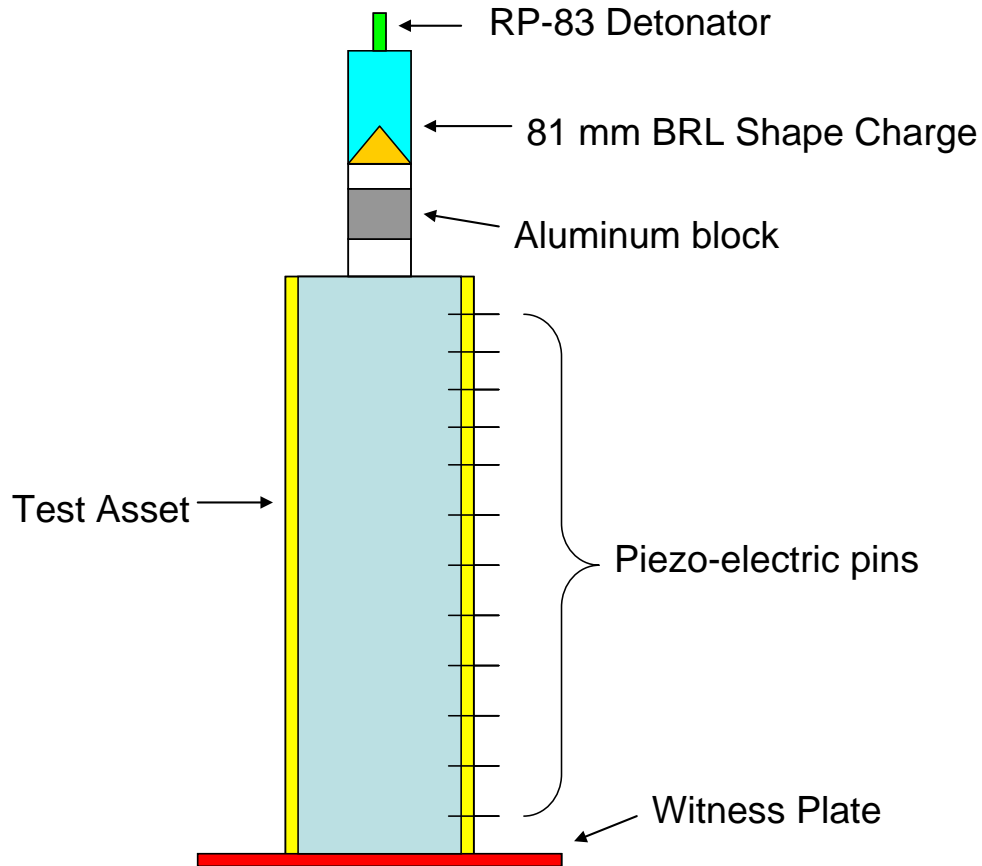
- **Harmonization of IM and HC**
  - **Shape Charge Threat**
- **New Alternate proposed in 2008**  
**DDESB seminar**
  - **Super Large Scale Gap Test with 81mm Shape Charge stimulus**



# Test Configuration

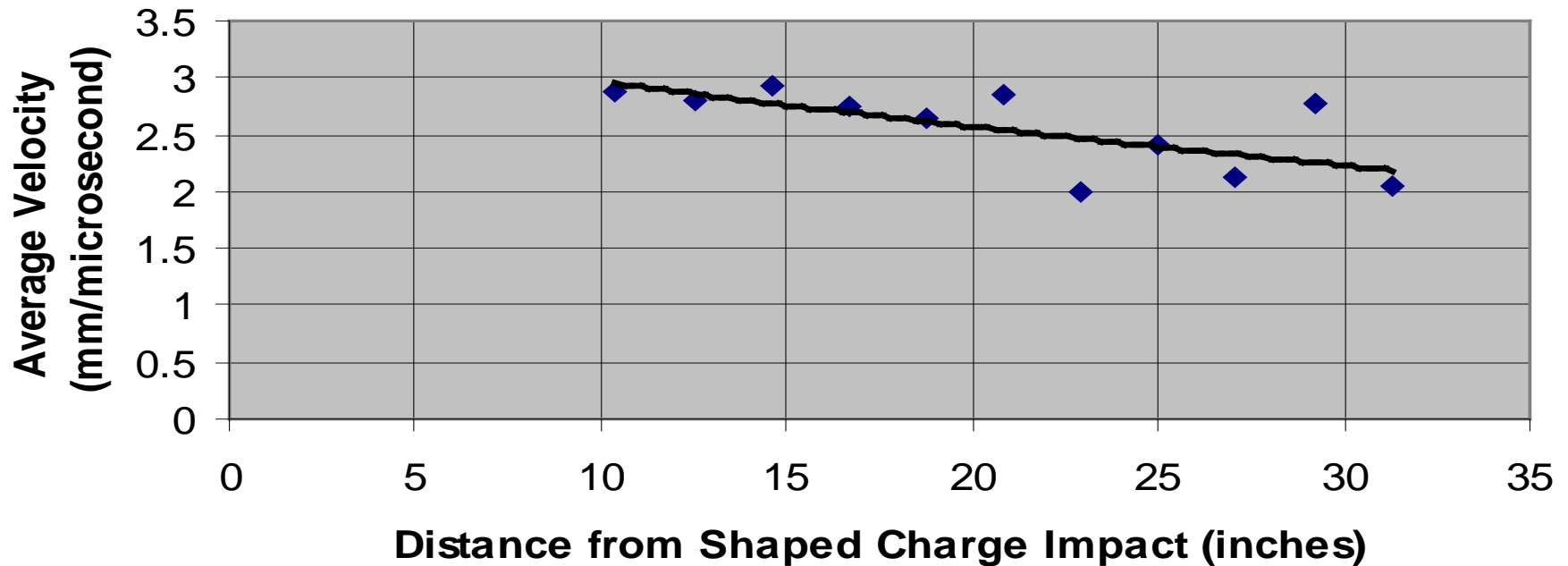


# Vertical Configuration



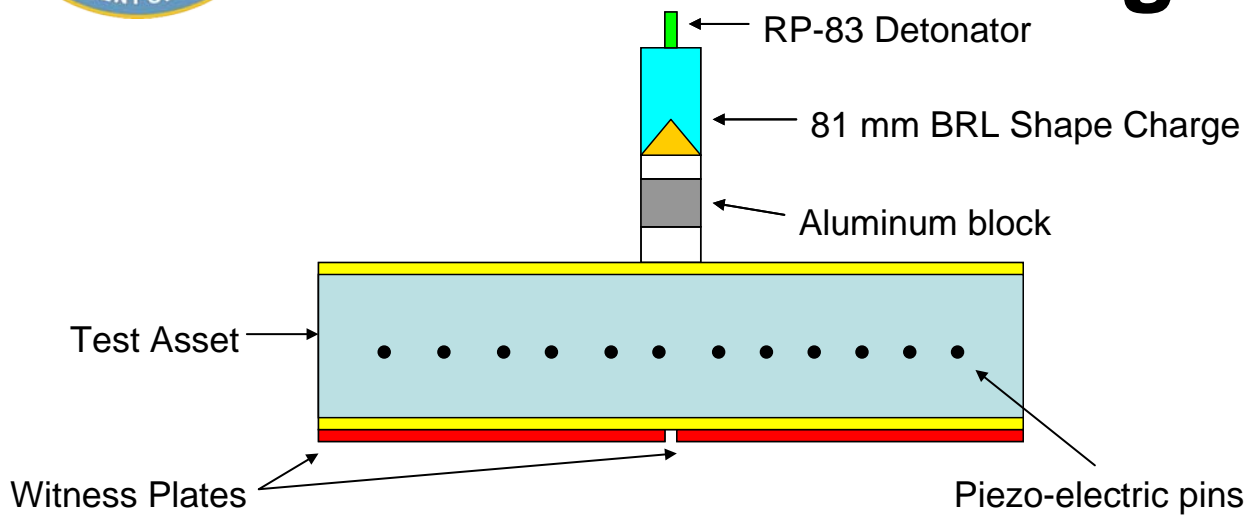


# Example of Shock Velocity





# Horizontal Configuration





# Samples



# Samples

- **HD 1.1**
  - **PBXN-109 – HTPB/RDX/AI**
  - **Critical Diameter less than 2.54 cm**
- **HD 1.3**
  - **AP/HTPB/AI**
  - **Critical Diameter > 213 cm**



# Test Configuration

- **6 Tests performed**
  - **4 - PBXN-109**
    - **Vertical Orientation**
      - Steel
      - PVC
    - **Horizontal Orientation**
  - **2 - HD 1.3 Propellant**
    - **Vertical Orientation**



# Results



# HD 1.1 Steel Confinement Movie

**Photron**

100000 fps

Manual 559139

FASTCAM SA1.1 model ...

1/100000 sec

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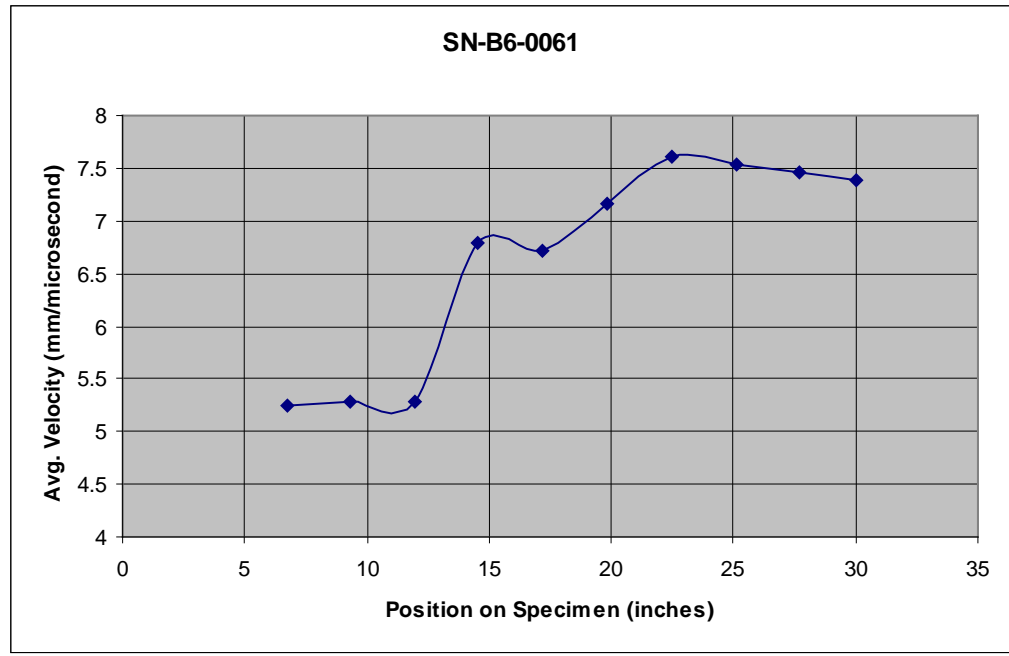
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# HD 1.1 Vertical Configuration





# HD 1.1 Horizontal Configuration

**Photron**

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Manual 559139

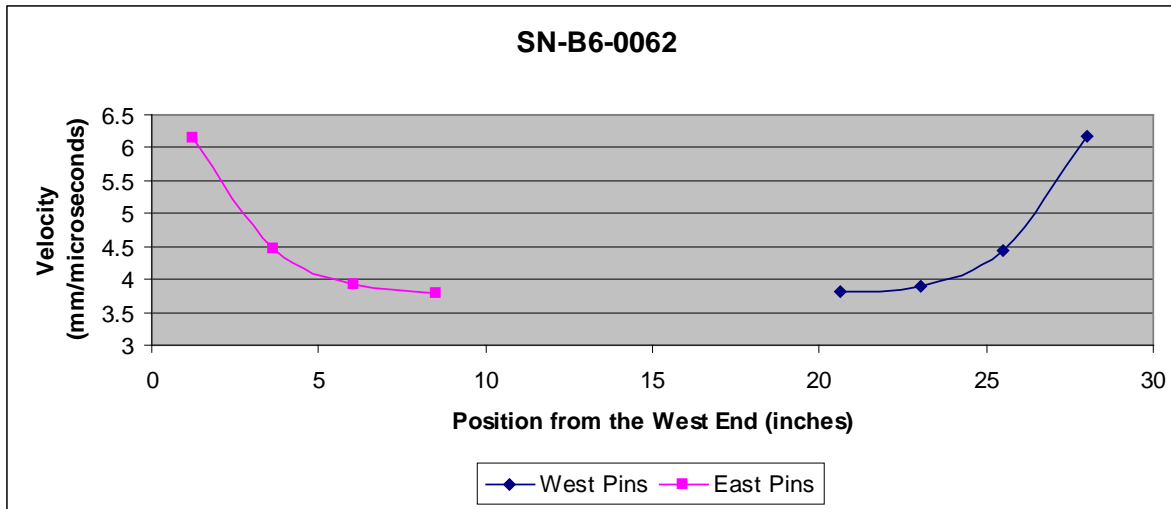
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# HD 1.1 Horizontal Configuration





# HD 1.3 Vertical Configuration

**Photron**

FASTCAM SA1.1 model ...

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Manual 62127

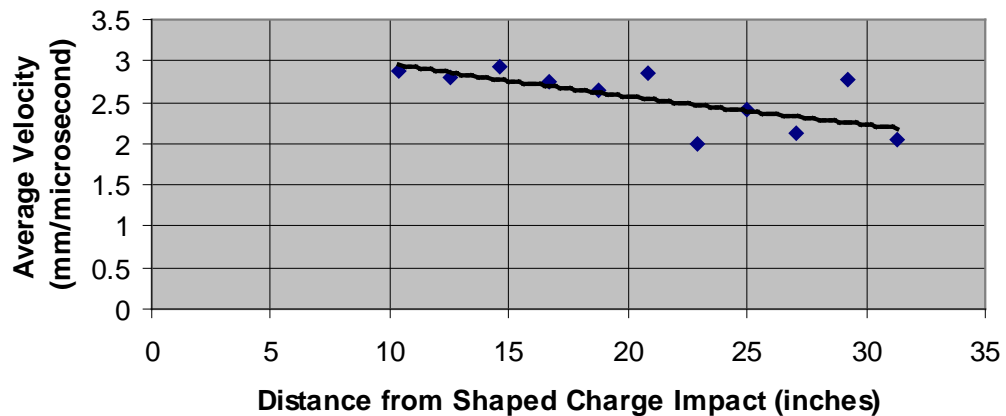
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# HD 1.3 Vertical Configuration

SN-B6-0065





# Summarized Results

	1	2	3	4	5	6
Orientation	Vertical	Horizontal	Vertical	Horizontal	Vertical	Vertical
Energetic Material	PBXN-109	PBXN-109	PBXN-109	PBXN-109	1.3 Propellant	1.3 Propellant
Case Material	Steel	Steel	Plastic	Plastic	Steel	Plastic
Pins: Go/No Go	Go	Go	Go	N/A	No Go	N/A
Witness Go/No Go	Go	Go	Go	No Go	No Go	No Go



# Conclusions

- **Differentiate between HD 1.1 and HD 1.3 in vertical configuration**
  - HD 1.3 Large critical diameter
  - Did not detonate
- **Confinement effect in horizontal configuration – PBXN-109**



# Future Work

- **Continue Populating Database**
  - HD 1.1, 1.2.X, and 1.3
- **Refinement of Horizontal Configuration**
  - Witness Plates to sides of item
  - Different Velocity technique
    - Crush Bar



# Extra Slides



# Pin Mixer Data

