Adapter Needs Analysis Coupling For the Fire Department in the North Jakarta Area

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ABSTRACT

Abriansyah, Herry. 2025. Adapter Needs Analysis Coupling For the Fire Department in the North Jakarta Area

The fire hose adapter functions to connect and disconnect hoses at their ends to channel water from the fire extinguishing system. Therefore, it is necessary to analyze the requirements for fire hose adapters, fire extinguisher couplings, and the various types of fire hose couplings. Based on the overall results, this design uses four types of couplings: Machino coupling, Vander Heyde coupling, Storz coupling, and Instantaneous coupling. Each type of coupling is connected to two different types of couplings into a single unit, known as an adapter.

Key Words: Adapter, fire hose coupling.

INTRODUCTION

In terms of the equipment owned by the fire department, there are various types of fire hose connections that need to be studied to understand their use and functions [1],[2]. These connections, commonly known as fire hose couplings, include the Vander Hyde coupling, Machino coupling, Storz coupling, and Instantaneous coupling [3]. Each type of coupling has different shapes and methods of operation in the fire-handling process. Using the appropriate type of hose connection can significantly speed up the fire extinguishing process [4],[5]. For example, in a fire incident occurring at a company that uses a type of fire hose connection incompatible with those used by the fire department, the work of firefighters may be delayed [6],[7].

Therefore, the author conducted an analysis of the need for adapter couplings for firefighters in the North Jakarta area. An adapter coupling is a combination of different fire hose couplings that can be utilized during firefighting operations [8],[9]. Adapter couplings are used to connect and disconnect hoses at their ends to channel water from the fire extinguishing system [10],[11],[12]. Currently, regional government regulations do not provide specific provisions regarding the compatibility of adapter couplings used by companies and those used by the fire department, nor do they specify the required type of adapter coupling to match fire department standards [13],[14],[15].

For this reason, it is necessary to analyze adapter coupling requirements for firefighters in the North Jakarta area, ensuring that all types of couplings can be integrated into a single unit that supports firefighters in optimizing their firefighting operations.

MATERIALS AND METHODS

The research method used in this study is a qualitative method with a descriptive approach. The research subjects are examined holistically and described in detail. This descriptive research aims to obtain in-depth information regarding the fire hose adapter coupling. In addition, this qualitative approach is expected to reveal the actual conditions and problems related to the fire hose adapter coupling.

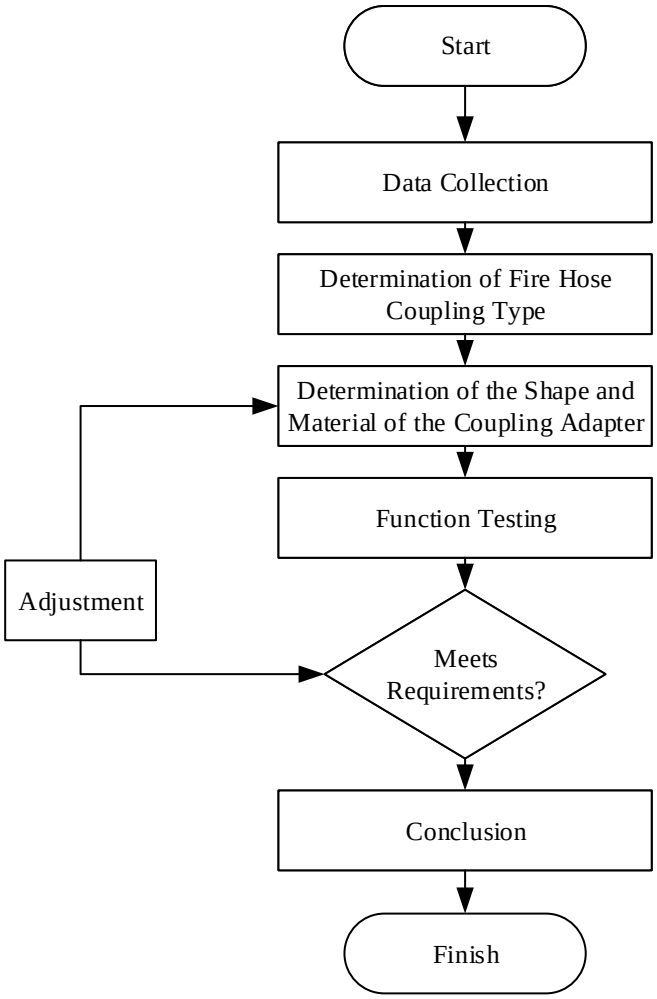


Figure 1. Flowchart

RESULTS AND DISCUSSION

The author conducted research on the analysis of fire hose adapter couplings, which includes examining the adapter components and the types of couplings used. Four types of hose couplings were utilized and then combined to create an adapter coupling that can be used by firefighters.

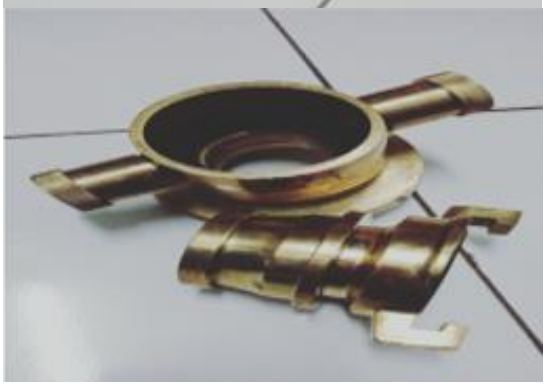
Indonesian National Standard for Couplings

This is a standard that applies nationally in Indonesia. The Indonesian National Standard (SNI) is formulated by a technical committee and established by the National Standardization Agency (BSN). National standards related to fire hose couplings refer to SNI 09-7053-2004 concerning fire-fighting vehicles and equipment, SNI 03-6570-2001 concerning pressure testing standards, the Regulation of the Minister of Public Works No. 26 of 2008 regarding technical requirements for fire protection systems in buildings and their environments, and Regional Regulation No. 92 of 2014 Articles 36 and 79, which stipulate that pressure limits must not exceed 24 bar with a minimum of 6.9 bar.

Results of the Fire Hose Adapter Coupling Combination

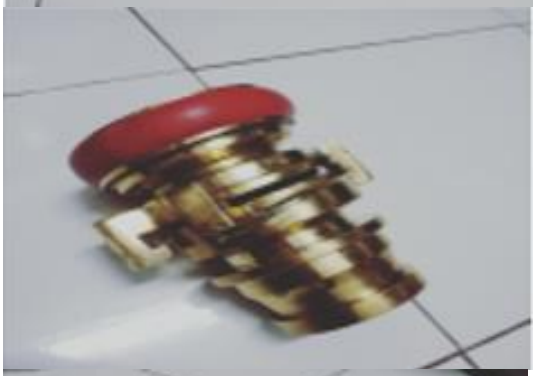
This refers to a combination of four types of fire hose adapter couplings derived from four types of couplings that can be utilized by firefighters.

Table 1. Overall Results of Coupling–Adapter Combinations

No.	Documentation	Workshop Condition
1.		Adapter Machino – Vander Heyde coupling
2		Adapter Storz – Vander Heyde coupling
3		Adapter Instantaneous – Vander Heyde coupling

4 

Adapter
Machino – Storz coupling

5 

Adapter
Machino – Instantaneous coupling

6 

Adapter
Storz – Instantaneous coupling

7 

Adapter
Storz – Instantaneous – Vender Heyde coupling

8		Adapter Machino – Instantaneous – Vender Heyde coupling
9		Adapter Storz – Machino – Vender Heyde coupling
10		Adapter Storz – Instantaneous – Machino - Vender Heyde coupling

Adapter Coupling Leak Test Results

Leakage testing on the adapter coupling was carried out by installing the fire hose on a 4000-liter fire engine at the Gading Griya Lestari Sukapura Cilincing fire station and the Pegangsaan Dua Kelapa Gading fire station.

Figure 2. Leak Testing Adaptor *Coupling.*

Table 2. Results of Coupling Adapter Leakage Test

No.	Adaptor Coupling	Pressure (Bar)	Time (seconds)	Leakage Description
1	Vander Heyde – Vander Heyde	5 Bar	10 seconds	No Leakage
2	Machino – Machino	5 Bar	10 seconds	Leaking
3	Instaneous – Instaneous	5 Bar	10 seconds	No Leakage
4	Storz – Storz	5 Bar	10 seconds	No Leakage
5	Machino – Vander Heyde	5 Bar	10 seconds	Leakage at Machino
6	Instaneous – Vander Heyde – Machino	5 Bar	10 seconds	Leakage at Machino
7	Instaneous – Storz	5 Bar	10 seconds	No Leakage
8	Instaneous – Machino	5 Bar	10 seconds	Leakage at Machino
9	Machino – Storz	5 Bar	10 seconds	Leaking
10	Instaneous – Storz – Machino – Vander Heyde	5 Bar	10 seconds	Leakage at Machino

CONCLUSION

This design utilizes four types of couplings—Machino, Vander Heyde, Storz, and Instantaneous. Each coupling type is interconnected with another to create an adapter, which is then evaluated through installation, removal, and leak testing. These tests were conducted individually to assess the performance and compatibility of each adapter arrangement. The company's coupling system differs from the fire department's standard couplings, which often causes difficulties for firefighters, particularly when connecting Vander Heyde couplings to the company's system.

The adapter testing was therefore carried out to identify which coupling combinations can better support operational efficiency for firefighters. The overall results from installation, disassembly, and leak examinations revealed several shortcomings. Some adapters showed manufacturing defects that caused leakage, and in several cases, the rubber seal quality on the couplings was found to be insufficient, leading to unreliable connections under pressure.

To enhance this research, it is recommended to include additional types of fire hose couplings and adapters, accompanied by more extensive pressure testing. This will expand technical understanding and improve compatibility assessments. It is also expected that building owner companies in DKI Jakarta, especially in North Jakarta, adopt coupling systems that align with fire department standards and provide appropriate adapter units to facilitate effective firefighting operations.

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