



**REDESIGN OF HAZARDOUS AND TOXIC WASTE TEMPORARY STORAGE IN
PHARMACEUTICAL COMPANY
(STUDY CASE: PT. CPR)**

UNDERGRADUATE FINAL PROJECT

**Submitted as one of the requirements to obtain
Sarjana Teknik**

**By:
BIMA RAMADHAN PRASETYO
018201900013**

**FACULTY OF ENGINEERING
ENVIRONMENTAL ENGINEERING STUDY PROGRAM
CIKARANG
JANUARY 2024**

TURNITIN TEST RESULT

Draft Final Project Rev01

ORIGINALITY REPORT

12%

SIMILARITY INDEX

11%

INTERNET SOURCES

4%

PUBLICATIONS

%

STUDENT PAPERS

PRIMARY SOURCES

1

www.ojs.serambimekkah.ac.id

Internet Source

7%

2

doaj.org

Internet Source

2%

3

Siti Rachmawati, Syafrudin Syafrudin, Budiyo Budiyo. "Assessment Of Health Service Facility Ash Waste Based On Policy (Case Study Of Moewardi Hospital Surakarta)", IOP Conference Series: Earth and Environmental Science, 2022

Publication

<1%

4

repository.president.ac.id

Internet Source

<1%

5

talenta.usu.ac.id

Internet Source

<1%

6

K.M. Bansal. "Exploration and Production Operations - Waste Management A Comparative Overview: US and Indonesia Cases", Proceedings of SPE Asia Pacific Oil

<1%

GPTZERO TEST RESULT

Document title

REDESIGN OF HAZARDOUS AND TOXIC WASTE TEMPORARY ST

Document author

Bima Ramadhan

REDESIGN OF HAZARDOUS AND TOXIC WASTE TEMPORARY STORAGE IN PHARMACEUTICAL COMPANY (STUDY CASE: AT PT. CPR)

Bima Ramadhan Prasetyo¹

¹Environmental Engineering Study Program, President University

1 INTRODUCTION

1.1 Background

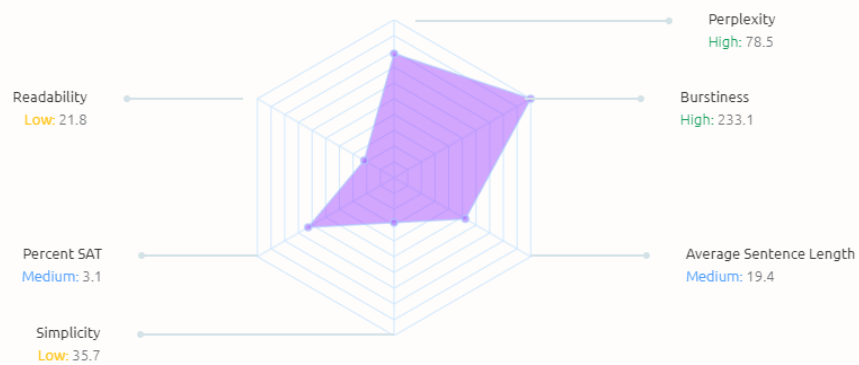
Indonesia is one of the countries with the most pharmaceutical companies. At 27% of the ASEAN pharmaceutical market, Indonesia has the most market share of any country in the ASEAN. Where local pharmaceutical companies dominate 73%



This text is most likely to be written by **a human**

There is a **1%** probability this text was entirely written by AI ⓘ

Writing Analysis



These measurements have been normalized on a scale of 1–100 for display on this chart.

ABSTRACT

PT CPR is a subsidiary of one of the largest pharmaceutical companies in Indonesia. In its production process, PT CPR produces hazardous and toxic waste, which, of course, makes PT CPR have an obligation to manage the hazardous and toxic waste it produces. However, based on observations, the existing temporary storage areas do not meet the standards set by the government. Therefore, the temporary storage area at PT CPR needs to be redesigned according to the standards set by the government. This research aims to find a temporary storage place that complies with government regulations for PT CPR and is equipped with calculations of the facilities needed. The method used is to record the type, characteristics, and amount of waste produced by PT CPR from the existing logbook, followed by existing observations, and then proceed with calculating facility needs according to SNI and individual calculations. After obtaining the data, redesign is carried out by adjusting the calculation results, determining the facilities needed, and making design proposals. The research results show that PT CPR requires a temporary shelter measuring 19.5 m x 10.8 m x 4.5 m to accommodate waste for 1 month, with the number of packages needed being 59 jumbo bags and 15 drums. The total ventilation required is 21.06 m² and is made of 105.9 m². The size of the spill container required for Toxic Liquid Waste is 2.2 m x 0.5 m x 1 m, and for Ignitability Liquid Waste is 5.5 m x 0.5 m x 1 m, also equipped with a channel made with a width of 0.15 m and a height of 0.15 m. The temporary storage area also has a 4 m wide Forklift Lane for loading and unloading activities. By conducting research, we can find out the regulations that apply to temporary storage areas in Indonesia and how to calculate the required facilities.

Keywords: hazardous and toxic waste, temporary storage, redesign, environmental management, Indonesian government regulations.

TABLE OF CONTENT

PANEL OF EXAMINER APPROVAL	II
STATEMENT OF ORIGINALITY	III
FINAL PROJECT REPORT APPROVAL.....	IV
SCIENTIFIC PUBLICATION APPROVAL.....	V
ADVISOR APPROVAL FOR PUBLICATION.....	VI
TURNITIN TEST RESULT.....	VII
GPTZERO TEST RESULT	VIII
ABSTRACT	IX
ACKNOWLEDGMENT	X
TABLE OF CONTENT.....	XI
LIST OF TABLES.....	XIII
LIST OF FIGURES	XIV
1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statements	4
1.3 Objectives	4
1.4 Scope and Limitations	5
1.4.1 Scope	5
1.4.2 Limitation	5
2 LITERATURE REVIEW	6
2.1 Hazardous and Toxic Waste.....	6
2.2 Hazardous and Toxic Waste Identification	6
2.2.1 Hazard Category	6
2.2.2 Source of The Waste	6
2.2.3 Characteristics of hazardous and toxic waste.....	7
2.3 Hazardous and Toxic Waste Symbols and Labels.....	8
2.4 Types of Places for Storage and Packaging of Hazardous and Toxic Wastes.....	10
2.5 Procedures and Techniques for Temporary Storage of Hazardous and Toxic Wastes	11
2.5.1 Compatibility Rules for Storage of Hazardous and Toxic Waste	11
2.5.2 Requirement for Storage of Hazardous and Toxic Waste.....	12
2.5.3 Rules for Symbolizing and Labeling Containers and/or Packaging of Hazardous and Toxic Waste..	13

3 RESEARCH METHOD	15
3.1 Research Frame work	15
3.2 Problem Identification	16
3.3 Site Observation	16
3.4 Literature Study	16
3.5 Design Parameter Determination.....	16
3.6 Data Collection.....	18
3.6.1 Primary Data	18
3.6.2 Secondary Data	18
3.7 Data Calculation	18
3.7.1 Quantity of Waste Measurement	18
3.7.2 Calculation of Facility Needs	19
3.7.3 Design Application	20
4 RESULTS AND DISCUSSIONS.....	21
4.1 Type, Characteristics and Quantification of Hazardous and Toxic Waste at PT CPR.....	21
4.2 Existing Condition and Compliance with The Requirements of Hazardous and Toxic Waste Temporary Storage PT CPR	27
4.3 Packaging and Pallets Used.....	32
4.4 Measurement of Spill Container	34
4.5 Measurement of Ventilation Needs.....	35
4.6 Measurement of Forklift Lane	36
4.7 Measurement of Hazardous and Toxic Waste Temporary Storage Size.....	36
4.8 First Aid and Fire Extinguisher Needs.....	38
4.9 The Design Proposal of Hazardous and Toxic Waste Temporary Storage.....	38
4.10 The Design Conformity of The Applicable Regulations	45
5 CONCLUSIONS AND RECOMMENDATIONS	47
5.1 Conclusions.....	48
5.2 Recommendations.....	50
REFERENCES	51
APPENDIX A.....	53
APPENDIX B.....	57

LIST OF TABLES

Table 1. Hazardous and Toxic Waste Symbol	8
Table 2 Hazardous and Toxic Waste Label	9
Table 3 Suitability of Hazardous and Toxic Waste Storage Facilities	10
Table 4 Compatibility Rules	12
Table 5 The List of Government Regulations.....	17
Table 6 Type and Identification of Hazardous and Toxic Waste	21
Table 7 Generation of PT CPR's Hazardous and Toxic Waste.....	22
Table 8 Generation of Hazardous and Toxic Waste from Sister Company.....	26
Table 9 The Results of Observation.....	30
Table 10 Total Packaging Requirements plan	33
Table 11 Temporary Storage Area Dimensions.....	37
Table 12 The Design Conformity of The Applicable Regulations	45

LIST OF FIGURES

Figure 1 The condition of the entrance to the existing temporary storage area.....	2
Figure 2 Temporary storage conditions in room A.....	3
Figure 3 Temporary storage conditions in room B.....	3
Figure 4 The condition of the open roof in room B.....	4
Figure 5 Example of attaching the symbol to the drum storage	14
Figure 6 Example of attaching a symbol to a storage area	14
Figure 7 Research Framework	15
Figure 8 Design Parameter Determination.....	16
Figure 9 Used Packaging Toxic Hazardous Materials waste generation graph.....	22
Figure 10 Expired and Reject Medicine Solid waste generation graph.....	23
Figure 11 Expired and Reject Medicine Liquid waste generation graph.....	23
Figure 12 Coating Solution waste generation graph.....	23
Figure 13 Media (Lab Waste) generation graph	24
Figure 14 TL Lamp generation graph	24
Figure 15 Benzalkonium chlorides waste generation graph	24
Figure 16 Used Syringes waste generation graph.....	25
Figure 17 Used Air Control Filter waste generation graph.....	25
Figure 18 Used oil waste generation graph.....	25
Figure 19 Methyl Ethyl Ketone waste generation graph	26
Figure 20 Existing Temporary Storage	27
Figure 21 Room A.....	28
Figure 22 Room B.....	28
Figure 23 Flood Hazard Map from inaRISK	29
Figure 24 Open roof condition in Room B	29
Figure 25 Condition of the ventilation and lighting system in Room B.....	30
Figure 26 Plastic Drum 200 Liter	32
Figure 27 Jumbo Bag	33
Figure 28 Pallet	34
Figure 29 Forklift CAT DP25N	36
Figure 30 Layout Proposal for Hazardous and Toxic Waste Temporary Storage PT CPR.....	39
Figure 31 Pallet and Supporting Facilities Placement Layout Plan.....	40
Figure 32 Temporary Storage Front View	41

Figure 33 Toxic Solid Waste Area.....41

Figure 34 Toxic Liquid Waste Area41

Figure 35 Ignitability Liquid Waste Area42

Figure 36 Infectious Solid Waste Area42

Figure 37 Temporary Storage Forklift Lane View42

Figure 38 Temporary Storage Lamp.....43

Figure 39 Fire Extinguisher & First Aid Facilities43

Figure 40 Emergency Response Facilities43

Figure 41 Existing and Future Plans Location.....44

Figure 42 Existing Layout of Hazardous and Toxic Waste Temporary Storage PT CPR.....45