

## **RESTORATION PROGRAM OF THE CAPE SANTIAGO LIGHTHOUSE IN BATANGAS, PHILIPPINES: INPUTS TO A PROPOSED PRESERVATION PLAN**

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### **ABSTRACT**

In the Philippines, the importance of lighthouses as aids to navigation has been the concern of maritime administration and the local government. The primordial significance of the lighthouse is to alert sea goers nearby, as well as to provide landmark navigation. One of the lighthouses is the century-old Cape Santiago Lighthouse, which is an imposing 51-foot white and red brick built in December 15, 1890 that monitors the Verde Island Passage. For over one century, the lighthouse survived natural calamities like typhoon and earthquakes. (Reyes, 2014) This historic landmark is prone to deterioration due to their rocky and uphill location near the sea, severe storms, and continued rise of the water during high tide. To preserve its structure and serves its primary purpose, a Restoration Program has been done through detailed examination, cleaning, repair, and in-kind replacement of worn-out materials. Thus, this study aimed to assess the Restoration Program in Cape Santiago Lighthouse in order to provide possible inputs to a Proposed Preservation Plan.

This study used the descriptive method of research to describe characteristics of a population or phenomenon being studied. The characteristics used to describe the situation or a population is usually some kind of categorical scheme also known as descriptive categories. (Cornell, Mendoza, and Bolotaolo, 2014). This study employed convenience sampling in the selection of community residents since it involves choosing the nearest individuals to serve as respondents and continuing that, process until the required sample size has been obtained or those who happen to be available and accessible at the time while purposive sampling was utilized in the selection of employees from the Local Government Unit-Tourism Office and National Historical Commission of the Philippines in order to access "knowledgeable people who have in-depth knowledge about particular issues. (Cohen, Manion, and Morrison, 2007)The respondents of the study were selected forty (40) Community Residents, ten (10) Local Government Unit- Tourism Office Employees and five (5) Employees of the National Historical Commission of the Philippines. They are classified according to age, gender, civil status, and educational attainment. A researcher-made questionnaire was used in order to get the needed data for the study. Data gathered were tabulated, presented and analyzed to come up with the findings. Results of the study revealed that, the Restoration Program of Cape Santiago Lighthouse was rated "very good" in terms of preventive maintenance, cleanliness, repair, and combining old and new materials; no significant difference existed as to assessment of the selected groups of respondents; there were problems encountered in its restoration program, and finally, a Proposed Preservation Plan was developed based from the findings of the study and rated highly acceptable by the selected groups of respondents. Based from the results, the conclusions are the Restoration Program of the Cape Santiago Lighthouse in Batangas, Philippines was rated good in terms of preventive maintenance, cleanliness, repair, and combining old and new materials in the restoration process; the respondents shared the same assessment as to the Restoration Program of the Cape Santiago Lighthouse; there were certain problems encountered as assessed by the three groups of respondents; and a Proposed

Preservation Plan was developed to maintain its primary purpose and historical landmark as one of the cultural heritages in the Province of Batangas, Philippines. The Plan shall concentrate on the Exterior of the Lighthouse such as Ground, Coatings (Paints, Stucco, Iron, etc.), Masonry (Cleaning of the Masonry), and Wood while the Interior such as Lantern, and Lens.

**KEYWORDS:** Lighthouse, Tourist Attraction, Preservation, Navigation, Historical Value

## INTRODUCTION

### Background

One of the lighthouses is the century-old Cape Santiago Lighthouse, which is an imposing 51-foot white and red brick built in December 15, 1890 that, monitors the Verde Island Passage. For over one century, the lighthouse survived natural calamities like typhoon and earthquakes. (Reyes, 2014) This historic landmark is prone to deterioration due to their rocky and uphill location near the sea, severe storms, and continued rise of the water during high tide. To preserve its structure and serves its primary purpose, a Restoration Program has been done through detailed examination, cleaning, repair, and in-kind replacement of worn-out materials. Thus, this study aimed to assess the Restoration Program in Cape Santiago Lighthouse in order to provide possible inputs to a Proposed Preservation Plan.

## METHODS

This study used the descriptive method of research to describe characteristics of a population or phenomenon being studied. The characteristics used to describe the situation or a population is usually some kind of categorical scheme also known as descriptive categories. (Cornell, Mendoza, and Bolotaolo, 2014). Furthermore, a survey questionnaire was utilized as the primary instrument in gathering data to answer the sub-problems of the study. This study employed convenience sampling in the selection of community residents since it involves choosing the nearest individuals to serve as respondents and continuing that process until the required sample size has been obtained or those who happen to be available and accessible at the time while purposive sampling was utilized in the selection of employees from the Local Government Unit-Tourism Office and National Historical Commission of the Philippines in order to access "knowledgeable people who have in-depth knowledge about particular issues.

(Cohen, Manion, and Morrison, 2007)The respondents of the study were selected forty (40) Community Residents, ten (10) Local Government Unit- Tourism Office Employees and five (5) Employees of the National Historical Commission of the Philippines. They are classified according to age, gender, civil status, and educational attainment. A researcher-made questionnaire was used in order to get the needed data for the study. The data collected were tabulated, presented, and analyzed to come up with the findings. The respondents of the study were selected forty (40) Community Residents, thirty (30) Local Government Unit- Tourism Office Employees and fifteen (15) Employees of the National Historical Commission of the Philippines. They are classified according to sex, age, civil status, educational attainment, and salary

This study aimed to assess the Restoration Program in Cape Santiago Lighthouse in Batangas, Philippines. Specifically, it sought to answer the following:

**How do the respondents assess the Restoration Program of the Cape Santiago Lighthouse in terms of?**

- Preventive Maintenance;
- Cleanliness;
- Repair; and
- Combining Old and New Materials for the restoration process?
- Is there a significant difference in the assessment of the respondents as to the Restoration Program of Cape Santiago Lighthouse?
- What are the problems encountered as to the Restoration Program of the Cape Santiago Lighthouse.
- Based from the findings of the study, what Proposed Preservation Plan may be developed?

**RESULTS**

**Formula and Equation**

**Percentage:** This was used to determine the profile of the respondents such as sex, age, civil status, educational attainment, and salary. The frequency and percentage were used. These tools were used for data presentation as it reduces all numbers in a range from 0-100 and also translate data into standard form with a base of 100, for relative comparison. (Calderon, 2005)

**Formula**

$$\text{Percentage (\%)} = f/n \times 100$$

Where: % = percentage

f = frequency of respondents

n = total number of respondents

**Weighted Mean.** It was computed by summing the product of item frequency multiplied by the weight of the item and divided by the total number of respondents. This was used to determine the assessment of the respondents as to the Restoration Program of the Cape Santiago Lighthouse.

**Formula**

$$\bar{X} = \frac{\sum f x}{n}$$

Where: X = weighted mean

f = frequency of respondents in a given criteria

x = numerical rating for the given criteria

n = total number of respondents

**Analysis of Variance.** It was used to analyze variance and used in making comparison of two or more means which enables to draw various results and predictions about two or more sets of data.

### Formula

$$F = \frac{MST}{MSE}$$

Where: F = ANOVA Coefficient

MST = Mean sum of squares due to treatment

MSE = Mean sum of squares due to error

**Formula for MST is given below:**

$$MST = \frac{SST}{p-1}$$

$$SST = \sum n (x - \bar{x})^2 \quad \text{---}$$

Where: SST = Sum of squares due to treatment

p = Total number of populations

n = Total number of samples in a population

**Formula for MSE is given below:**

$$MSE = \frac{SSE}{N-p}$$

$$SSE = \sum (n - 1) S^2 \quad \text{---}$$

Where: SSE = Sum of squares due to error

S = Standard deviation of the samples

N = Total number of observations

### FIGURES AND TABLES

**Table 1: Description of the Respondents**

		Number of Respondents (NR)	Percentage of NR to Number of TR
Sex	Male	26	30.59%
	Female	59	69.41%
Age	21 – 25 years old	12	14.12%
	26-30 years old	6	7.06%
	31-35 years old	13	15.29%
	36-40 years old	21	24.71%
	41-45 years old	15	17.65%
	46-50 years old	8	9.41%
	51 years old and above	10	11.76%
Civil Status	Single	47	55.30%
	Married	33	38.82%
	Widow/Widower	3	3.53%

		Table 1: Condt...	
	Legally Separated	2	2.35%
Educational Attainment	Undergraduate	21	24.71%
	Bachelor's Degree	48	57.47%
	With Master's Units	8	9.41%
	Master's Degree	5	5.88%
	With Doctorate Units	1	1.18%
	Doctorate Degree	2	2.35%
Salary	Less than 10000	3	3.53%
	10001-20000	30	35.29%
	20001-30000	32	37.65%
	30001-40000	12	14.12%
	40001-50000	6	7.06%
	50001 and above	2	2.35%

## RESULTS AND DISCUSSIONS

On the assessment the Restoration Program of Cape Santiago Lighthouse in terms of preventive maintenance, cleanliness, repair, and combining old and new materials.

### PREVENTIVE MAINTENANCE

Table 2: Assessment as to the Restoration Program of Cape Santiago Lighthouse on Preventive Maintenance

Criteria	Community Residents		LguTourism Employees		Nhcp Employees		Composite Weighted Mean	
	WM	VI	WM	VI	WM	VI	WM	VI
1. Conducting minor repair works and touch ups.	3.26	G	3.31	G	2.22	P	2.93	G
2. Up keeping of old structures	3.12	G	3.12	G	4.11	VG	3.45	V G
3. Provision of pest control treatment	2.77	G	2.98	G	2.44	P	2.73	G
4. Rust conversion and refining of metal components	2.63	G	3.36	G	3.44	VG	3.14	G
Overall Weighted Mean	2.95	G	3.19	G	3.05	G	3.06	G

#### Legend

4.20 - 5.00 Excellent

3.40 -4.17 Very Good

2.60 - 3.39 Good

1.80 - 2.59 Poor

1.00 - 1.79 Very Poor

As presented in Table 2, the Community residents assessed all the items presented under the preventive maintenance which are “conducting minor repair works and touch ups,” “up keeping of old structures,” “provision of pest control treatment,” and “rust conversion and refining of metal components” as good with mean values of 3.26, 3.12, 2.77, and 2.63 which yielded an overall composite weighted mean of 2.95, verbally interpreted good.

However, the LGU-Tourism Employees assessed all items presented under the same criteria as good supported by mean values of 3.31, 3.12, 2.98, and 3.36 and yielded an overall composite weighted mean of 3.19, verbally interpreted as good.

Meanwhile, the NHCP Employees assessed “up keeping of old structures” and “Rust conversion and refining of metal components” as very good; with mean values of 4.11 and while 3.44 while “Conducting minor repair works and touch ups” and “Provision of pest control treatment” as poor with mean values of 2.22 and 2.44.

Generally, the respondents assessed the Restoration Program of the Cape Santiago Light house on Preventive Maintenance as good supported by the overall weighted mean of 3.06.

## CLEANLINESS

**Table 3: Assessment as to the Restoration Program of Cape Santiago Lighthouse on Cleanliness**

Criteria	Community Residents		Lgu Tourism Employees		Nhcp Employees		Composite Weighted Mean	
	WM	VI	WM	VI	WM	VI	WM	VI
1. Removal of vegetal and woody growths	2.70	G	3.33	G	3.00	G	3.01	G
2. Floor waxing and Polishing	3.44	VG	3.45	VG	2.77	G	3.22	G
3. Dusting	2.91	G	3.68	VG	3.22	G	3.27	G
<b>Overall Weighted Mean</b>	<b>3.02</b>	<b>G</b>	<b>3.49</b>	<b>VG</b>	<b>3.00</b>	<b>G</b>	<b>3.17</b>	<b>G</b>

As shown in Table 3, the Community residents assessed “Floor waxing and polishing as very good with mean value of 3.44. However, they assessed “Removal of vegetal and woody growths” and “Dusting” as good supported by their respective mean values of 2.70 and 2.91 which yielded an overall composite weighted mean of 3.02, verbally interpreted as good.

The Local Government Unit-Tourism Employees assessed “Floor waxing and polishing” and “Dusting” as very good supported by their mean values of 3.45 and 3.68. Meanwhile, they assessed “Removal of vegetal and woody growths” as very good with obtained weighted mean value of 3.33 yielded an overall weighted mean value of 3.49 verbally interpreted as very good.

Meanwhile the NHCP employees assessed all items under the same criteria as good supported by mean values of 3.00, 2.77, and 3.22 which yielded an overall mean value of 3.00, interpreted as good.

Summarily, the respondents assessed the Restoration Program of the Cape Santiago Lighthouse on Cleanliness as good supported by the overall weighted mean of 3.17.

**REPAIR**

**Table 4: Assessment as to the Restoration Program of Cape Santiago Lighthouse on Repair**

Criteria	Community		Lgu Tourism		Nhcp		Composite	
	Residents		Employees		Employees		Weighted Mean	
	WM	VI	WM	VI	WM	VI	WM	VI
1. Correcting defects by partial and direct replacement using light materials and method of construction	2.65	G	3.43	VG	2.88	G	2.99	G
2. Repainting	3.40	VG	3.23	G	1.66	VP	2.76	G
3. Re-plastering	2.88	G	3.87	VG	2.22	P	2.99	G
Overall Weighted Mean	2.98	G	3.51	VG	2.25	P	2.91	G

As revealed in Table 4, the community residents assessed “Repainting” as very good with mean value of 3.40. However, they assessed “Correcting defects by partial and direct replacement using light materials and method of construction” and “Re-plastering” as very good supported by mean values of 2.65 and 2.88 which yielded an overall weighted mean of 2.98 verbally interpreted as good.

The LGU-Tourism Employees assessed “Correcting defects by partial and direct replacement using light materials and method of construction” and “Re-plastering” as very good supported by their respective obtained mean values of 3.43 and 3.87. Meanwhile, they assessed “Repainting” as good with mean value of 3.23 which yielded an overall weighted mean of 3.51, verbally interpreted as very good.

Moreover, the NHCP Employees assessed “Correcting defects by partial and direct replacement using light materials and method of construction” as good supported by the weighted mean value of 2.88, “Re-plastering” as Poor supported by the weighted mean value of 2.22; and “Repainting” as very poor supported by the weighted mean value of 1.66 and yielded an overall weighted mean value of 2.25, verbally interpreted as Poor.

As a whole, the respondents assessed the Restoration Program of Cape Santiago Lighthouse on Repair as good supported by the overall obtained weighted mean of 2.91.

**COMBINING OLD AND NEW MATERIALS IN THE RESTORATION PROCESS**

**Table 5: Assessment as to the Restoration Program of Cape Santiago Lighthouse on Combining Old and New Materials in the Restoration Process**

Criteria	Community Residents		Lgu Tourism Employees		Nhcp Employees		Composite Weighted Mean	
	WM	VI	WM	VI	WM	VI	WM	VI
1. Using modern materials and technologies for the restoration process.	2.85	G	3.75	VG	3.00	G	3.09	G
2. Replace only those components that are beyond repair.	2.86	G	3.77	VG	3.88	VG	3.62	VG
Overall Weighted Mean	2.86	G	3.76	VG	3.44	VG	3.35	G

As depicted in Table 5, the community residents assessed both “Using modern materials and technologies for the

restoration process “and “Replace only those components that are beyond repair” as good supported by mean values of 2.85 and 2.86, respectively. It yielded an overall weighted mean value of 2.86, verbally interpreted as good.

However, the LGU-Tourism Employees assessed both criteria on “Using modern materials and technologies for the restoration process” and “Replace only those components that are beyond repair” as very good with mean values of 3.75 and 3.77 respectively. It yielded an overall weighted mean of 3.76, verbally interpreted as very good.

The NHCP Employees assessed “Replace only those components that are beyond repair” as Very Good supported by the obtained weighted mean of 3.88 while “Using modern materials and technologies for the restoration process” as good supported by the obtained weighted mean of 3.00. It yielded an overall mean value of 3.44, verbally interpreted as very good.

Generally, the respondents assessed the criteria on combining old and new materials in the restoration process as good supported by the overall grand mean of 3.35.

**Table 6: Summary Table on the Assessment of Respondents as to the Restoration Program of Cape Santiago Lighthouse**

Criteria	Community Residents		Lgu-Tourism Employees		Nhcp Employees		Composite Weighted Mean	
	WM	VI	WM	VI	WM	VI	WM	VI
1.Preventive Maintenance	2.95	G	3.19	G	3.05	G	3.06	G
2. Cleanliness	3.02	G	3.49	VG	3.00	G	3.17	G
3. Repair	2.98	G	3.51	VG	2.25	P	2.91	G
4.Combining old and new materials in the restoration process	2.86	G	3.76	VG	3.44	VG	3.35	G
Overall Weighted Mean	2.95	G	3.49	VG	2.94	G	3.12	G

As revealed in Table 6, the community residents assessed “Preventive Maintenance,” “Cleanliness,” “Repair,” and “Combining old and new materials in the restoration process” as good supported by their respective obtained overall weighted mean values of 2.95, 3.02, 2.98, and 2.86. It yielded an overall weighted mean value of 2.95, verbally interpreted as good.

However, the LGU-Tourism Employees assessed “Cleanliness,” “Repair,” and “Combining old and new materials in the restoration process” as very good supported by their respective obtained weighted mean values of 3.49, 3.51, and 3.76; while “Preventive Maintenance” as good with obtained weighted mean value of 3.19. It yielded an overall weighted mean value of 3.49, verbally interpreted as very good.

The NHCP Employees assessed “Combining old and new materials” as very good supported by the obtained weighted mean value of 3.44; “Preventive Maintenance” and “Cleanliness” assessed as good supported by obtained weighted mean values of 3.05 and 3.00; while “Repair” as poor supported by the obtained weighted mean value of 2.25. It yielded an overall weighted mean of 2.94, verbally interpreted as good.

Generally, the respondents assessed the Restoration Program of Cape Santiago Lighthouse in terms of preventive maintenance, cleanliness, repair, and combining old and new materials as good supported by the obtained grand mean value of 3.12.

**On the Significant Difference on the Assessment of the Respondents as to the Restoration Program of the Cape Santiago Lighthouse**

**Table 7: Significant Difference on the Assessment of Respondents as to the Restoration Program of Cape Santiago Lighthouse**

Sources Of Variation	SS	Df	MS	F-Ratio	F-Critical Value At.05	Decision	Verbal Interpretation
Between	0.7890	2	0.3945	3.8639	4.26	Accept Ho	Not Significant
Within	0.9189	9	0.1021				

It could be observed that, the computed F- value of 3.8639 is less than the F- critical value of 4.26 at.05 level of significance with 2/9 degree of freedom. The statistical decision is to accept the null hypothesis and verbally interpreted as not significant.

Therefore, there is no significant difference in the assessment of the three groups of respondents as to the Restoration Program in Cape Santiago Lighthouse in Batangas. Philippines.

**On the Problems Encountered as to the Restoration Program of the cape Santiago Lighthouse**

**Table 8: Problems Encountered as to the Assessment of the Respondents on the Restoration Program of Cape Santiago Lighthouse**

Criteria	Community Residents	LGU Tourism Employees	NHCP Employees	Total	Rank
	f	f	f	f	
1. No re-painting and re-plastering	28	8	4	40	1
2. Broken bricks are not replaced	23	8	5	36	3
3. Minor damage is not repaired immediately.	25	8	4	37	2
4. No provision for pest control treatment	11	8	3	22	5
5. Rusty railings	13	8	3	24	4

As shown in Table 8, the community residents, Local Government Unit-Tourism employees and NHCP employees generally encountered problems as to their assessment on the Restoration Program of Cape Santiago Lighthouse such as “No re-painting and re-plastering” with a frequency of 40 as rank 1; “Minor damage is not repaired immediately” with a frequency of 37 as rank 2; “Broken bricks are not replaced” with a frequency of 36 as rank 3; rusty railings with a frequency of 24 as rank 4; and No provision for pest control with a frequency of 22 as rank 5.

**ON THE PROPOSED PRESERVATION PLAN BASED FROM THE FINDINGS OF THE STUDY**

A Proposed Preservation Plan was developed based from the findings of the study in order to maintain the beauty of the architectural and historical landmark in the province of Batangas, Philippines which are considered a living connection to the past and a symbol of community pride. The Plan concentrates on the Exterior of the Lighthouse such as Ground, Coatings (Paints, Stucco, Iron,), Masonry (Cleaning of the Masonry), and Wood while the Interior such as Lantern, and Lens. The parts of the Preservation Plan include Key Result Areas; Objectives; Activities; Personnel

Involved; Time Frame; Budgetary Requirements; and Performance Indicators.

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This also certifies that, the paper presented is original and was not previously published elsewhere. The paper and the information herein are provided for the sole purpose of exploring research opportunities between the disclosing and receiving party, that concerns Restoration Program of the Cape Santiago Lighthouse in Batangas, Philippines and may not be disclosed to any third party or used for any other purpose without the written permission from the disclosing party.

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