

Thesis Proposal

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The Salamander Resort and Spa

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EXECUTIVE SUMMARY

This document proposes several different topics for my research next semester. The four analyses that I chose include schedule deceleration, guest room energy conservation, efficient landscaping, and the impact of the current economic status on my project. The majority of my topics focus on energy use and ways to reduce overall lifecycle costs.

Analysis I: Schedule Deceleration

This analysis focuses on the choice by the owner to decelerate the schedule and overall project finish date by one year. An investigation into the cost implications of completing the project on time and letting it sit empty for the additional year is performed. Research is done to determine the overall lost income the owner will incur by not opening in March 2009.

Analysis II: Guest Room Energy Conservation

A significant amount of energy use in hotels is wasted due to occupants not turning off lights and turning the heat down when not in the room. This analysis investigates ways to reduce energy use in each of the guest rooms by altering lighting and mechanical fixtures and controls.

Analysis III: Efficient Landscaping

This analysis topic deals with the landscaping plan and irrigation system in place. I investigate alternative plants and their organization on site in order to reduce redundant watering. A redesign of the irrigation system is also proposed.

Analysis IV: Economic Impact

This final analysis explores the impact the current economic situation has had on the project. Value engineering has changed a large portion of the systems in the building and this analysis looks into which of those topics impact the overall image the owner wants for the building.

Breadth Analysis 1: Lighting/Electrical

Analysis II incorporates a lighting redesign in the guest rooms for reduce overall energy use when the guests are and are not in the room. The lighting breadth will be used to find before and after energy costs and payback period for the added fixtures and systems.

Breadth Analysis 2: Mechanical

Analysis II involves a mechanical redesign in the guest lodge to allow the building manager to be able to control the temperature and humidity of each room independently. The mechanical breadth will be used to find before and after energy costs and payback period for the added system.

INTRODUCTION

Building Name: Salamander Resort and Spa
Location and Site: Middleburg, Virginia. 340 acres
Building Occupant Name: Salamander Hospitality
Occupancy: Mixed use. Hotel, spa, equestrian center
Size (total square feet): 230,000 sf
Building Cost: \$93 million
Dates of Construction: March 2007 – March 2011

Building Enclosure:

Building Facades: There are two major exterior wall facades on the Salamander Resort and Spa. Stone and stone veneer is used on the main entrance building, front and rear. The stone is used on the lower portion of the wall and the stone veneer is used on the middle and upper portion to reduce overall weight. The remainder of the main building and guest wing is stucco.



Roofing:

The roof consists of three different types. Composite slate shingle roofing is used on all slanted roofs. EPDM single ply - fully adhered (TPO) or Modified Bituminous Irma Roofing Systems are used for all flat roofs, usually found in the mechanical spaces.

Structural:

The structural system for The Salamander Resort is primarily concrete framing. The basement floor is 5-inch slab on grade with concrete columns ranging from 18x18 to 24x24. The main building uses steel framing on the first floor. The spa area utilizes post-tensioned concrete beams with typical size of 18x22. Two inch 18 gage Lok-Floor composite metal decking with 9 inch concrete with continuous welded wire fabric reinforcing is used for the guesthouse. Typical column size in the guesthouse is 16x28 on all four floors. 1.5 inch deep, wide rib, 20 gage galvanized roof decking is used along with lightgage steel roof trusses with 8" purlin at 48" on center.

Mechanical:

The main mechanical room is located on the basement floor in the northeast corner, directly below the kitchen and restaurant. There are also 15 AHU's located on the roof, 9 Variable Frequency Drive (VFD) and 6 Constant Volume (CV). Constant Volume AHU's control the exhaust air from the kitchen on both the basement and first floors. An additional 6 heat recovery AHU's are distributed between the main lodge, spa and laundry room. A 1950 gpm cooling tower located on the roof serves chillers 1 through 3.

Lighting/Electrical:

The main electrical rooms are located on the basement floor in the northeast and southeast corners. Main power from the utility comes through the onsite transformer and is converted to 3200A 480/277V – 3 phase 4W. Secondary power is 120/208V – 3 phase. On the basement floor, adjacent to the truck delivery area, is an indoor emergency generator with 650kW 480/277V – 3 phase 4W power. Also located in the basement is an Uninterrupted Power Supply (UPS) that supplies power to the 4th floor guesthouse and 1st floor main building. A majority of the lighting fixtures in the restaurant, spa, and lobby area are custom designed by a lighting contractor.

ANALYSIS I: SCHEDULE DECELERATION

Problem Statement:

The initial design and schedule for The Salamander Resort and Spa was for completion to be in March 2009. Per owner's request, the project was delayed 12 months to March 2010. This was done because the owner did not want to open a high-end resort in the current economic climate. The name of the company is on the building, and they did not want the public to see them as unsuccessful in renting out rooms. This intentional slowdown of the schedule creates more work for the contractor, specifically the scheduler. The cost impact is significant in part from the added 12 months of general conditions and from the lost revenue from the guest rooms that could have been rented, had it opened in 2009.

Proposed Solution:

I believe that the added cost of schedule deceleration makes it very unappealing to the owner. I will investigate other projects that slowed their schedule down and compare it to this project. A possible solution could be to keep the original schedule but not open it upon completion. This will eliminate the added construction costs but add building upkeep costs. The goal of this analysis is to determine the lost revenue and added construction costs of the decelerated schedule in relation to the original.

Steps:

- Contact the Turner Construction scheduler
- Research other deceleration projects and compare
- Determine costs for extra year of construction
- Determine lost monthly revenue from renting rooms
- Determine monthly energy costs for maintaining an empty building

Expected Outcome:

The total cost, lost revenue plus construction costs will be a significant portion of the overall project cost.

ANALYSIS II: GUEST ROOM ENERGY CONSERVATION

Problem Statement:

As with most hotels and resorts, a large amount of energy is wasted due to occupants leaving the lights on when they are out of the room. The Salamander Resort and Spa has 165 guest rooms and the likelihood of everyone turning off unneeded lights is very low. When in the room, occupants also tend to use more light than is necessary, having multiple light fixtures on at once. Lack of temperature control is also a key component in energy costs. Temperatures in each room are kept constant without taking into effect whether or not it is occupied.

Proposed Solution:

By installing energy efficient lighting fixtures and automated controls, the energy use can be drastically reduced. Many hotels in Asia utilize a slot right inside the door to place your key, that when placed there, the electricity is turned on for the room. Upon leaving, you take your key, and all the lights and electronics turn off. There are also more automated systems that could be used like motion sensors to detect whether the room is occupied. To solve the problem of heating and cooling an unoccupied room, a central control system could be installed to allow the resort managers to control the temperature of each room individually. This way, they could turn down the heat or air conditioning in rooms that are not rented for the night.

Steps:

- Research current fixtures
- Determine current energy use per room
- Research alternate fixtures and control systems
- Choose appropriate fixtures and control system
- Determine new energy use per room
- Calculate monetary savings per month
- Research HVAC control systems
- Calculate energy savings with new HVAC system
- Explore schedule impacts for both redesigns

Expected Outcomes:

The lighting and HVAC redesign will yield large energy savings when the system is applied to all 165 rooms. Each room will require a little less energy than before, but when each piece is added up, the total can be significant.

ANALYSIS III: EFFICIENT LANDSCAPING

Problem:

The Salamander Resort and Spa is trying to achieve a LEED Certified rating. The current plan includes an irrigation plan for the extensive set of trees, shrubs, and flowers around the building. There are roughly 40 different types of trees and 30 different shrubs that will be planted around the building. Some of the trees are used extensively at over 100 locations, while others are only used 2 or 3 times. It is inefficient and expensive to ship in such low quantities. Due to the large number of plantings, an efficient network of irrigation pipes is needed to reduce water use.

Proposed Solution:

The most important aspect will be an analysis of the current systems water use and the research of new, more efficient equipment. I will also explore the use of native trees and plants that will survive with little to no added irrigation. Plants that need little or no irrigation can be grouped together and placed away from ones that need water. In order to reduce the water utility bill, a large rainwater collection tank will be installed to provide additional water for irrigation. The landscaping does not fall on the critical path so a schedule analysis will not be needed.

Steps:

- Determine water usage of current system
- Research water efficient irrigation systems
- Make a scale that shows water need for each plant type
- Group together plants with similar water needs
- Layout landscaping
- Design irrigation plan
- Calculate overall water use
- Compare water use to old system

Expected Outcome:

The current irrigation system uses more water than is necessary for adequate watering. A redesign of the landscape layout and irrigation system will reduce water use.

ANALYSIS IV: ECONOMIC IMPACT

Problem:

The economy in the past year has had a direct negative impact on the construction industry in the US and around the world. As a result, fewer owners are willing to invest their money in new construction. Contractors are focusing their work on their specialties that are least affected by the recession like health care and data centers, and staying away from apartment complexes and hotels. Despite the high-end nature of The Salamander Resort and Spa, the affect is still being felt by the owner. One of the main reasons the schedule was pushed back by one year was that the owner did not want the resort to open in the current economic climate. They felt that people would not want to spend money to stay at the resort because of the high prices. It affect the economy has on the project can also be seen in the large number of value engineering ideas. All main systems were value engineered to some degree, and some designs were not complete in time for construction due to value engineering.

Proposed Solution:

While the economy cannot be turned around overnight, the ways and methods that the owner took in response to it are less than desirable. I will take a look into what items and systems were value engineered and see whether or not they would have positively affected the image of the resort. If the owner is correct in saying that this will be one of the most prestigious resorts in the country, why are they value engineering every system? At what point will this take away from the original image. I will take a look into what are the items that will have a direct impact on the occupants and their additional cost to the owner. These tie into the first analysis of schedule deceleration and the cost impact it has on the owner.

Steps:

- Obtain the full list of value engineering topics
- Identify which ones have the most 'value added'
- Identify which ones will have a direct impact on guests
- Choose a list of value engineering topics that would be most beneficial not to cut
- Determine added cost
- Explain why these topics are most beneficial

Expected Outcomes:

The owner over value engineered and degraded the quality and image of the resort purely for monetary reasons. A careful selection of individual value engineering topics can assist in the image and have a small monetary effect on the owner.

CONCLUSION

The goal of each of these analyses is to further my understanding in the main construction issues, value engineering, schedule impact, constructability, and research and how they relate to The Salamander Resort and Spa. The topics of interest focus mainly on energy use and ways to reduce lifecycle costs while still maintaining the original image that the owner perceived. The breadth topics will further my knowledge in areas outside of construction management to that of lighting and mechanical systems.

WEIGHT MATRIX and SCHEDULE

The table below shows the emphasis I will place on each topic for my analyses.

Description	Research	Value Engr.	Constr. Rev.	Schedule	Total
Analysis I	-	5	-	15	20
Analysis II	15	10	10	-	35
Analysis III	10	-	10	-	20
Analysis IV	5	15	-	5	25
Total	30	30	20	20	100

The table below shows the dates in which I plan on working on each aspect of the thesis.

Activity	Start Date	End Date
Semester Start	11-Jan	
Analysis I: Schedule Deceleration	11-Jan	24-Jan
Research similar project	11-Jan	13-Jan
Determine lost revenue	14-Jan	20-Jan
Perform building energy calculations	21-Jan	24-Jan
Analysis II: Guest Room Energy Conserv.	25-Jan	19-Feb
Research lighting fixtures/systems	25-Jan	31-Jan
Perform before/after energy calcs	1-Feb	5-Feb
Research HVAC controls	6-Feb	11-Feb
Perform before/after energy calcs	12-Feb	16-Feb
Explore schedule impacts	17-Feb	19-Feb
Analysis III: Efficient Landscaping	20-Feb	8-Mar
Research irrigation systems/landscapes	20-Feb	25-Feb
Group/layout new landscape plan	26-Feb	2-Mar
Determine water use before and after	3-Mar	8-Mar
Analysis IV: Economic Impact	9-Mar	23-Mar
Identify most 'value added' VE topics	9-Mar	15-Mar
Determine added cost	16-Mar	23-Mar
Write final report	24-Mar	6-Apr
Final report due	7-Apr	
Work on final presentation	29-Mar	11-Apr
Final presentations	12-Apr	

APPENDIX A: BREADTH STUDIES

Lighting/Electrical:

Analysis II utilizes a redesign of the lighting fixtures and control system to save energy in the guest rooms. This will also assist in the LEED certification that the resort is trying to achieve. The incorporation of compact florescent and LED lighting over incandescent lighting will greatly reduce the buildings energy footprint and lifecycle costs.

Mechanical:

Along with a lighting and electrical redesign, Analysis II has a mechanical system alteration. I propose to add a central control system that can be controlled in one location, in which the temperature and humidity can be changed in each room independently depending on the occupancy. This will allow the building manager to turn the heat or air conditioning down if the guest room is not rented out that night and thus reducing unnecessary energy use.