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## Restoration of Old Buildings Built of Stone, Palaces and Castles at Taif City for Sustainability of this Buildings

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**ABSTRACT:** Experiencing the city of Taif urban boom and wide, and stage of prosperity shown the lack of harmony in mostly urban design for building in areas supposed to be characterized by the consolidation of architectural style. Where were built by using different types of building stones Industrial locally manufactured or imported and precious, in addition to the use of other types of plastering and cladding materials. Since that the city of Taif is rich in various types of stone construction and raw materials that can be extracted for use in all stages of construction and at a lower cost, and achieve the purpose of the use. This matter needs to a gesture from the official bodies confirming the need to unify the processes of designing and construction at these centers style, taking into account the adoption of construction pattern as old Saudi-style by using the local stone in construction processes, or building new areas within the city limits according to the master plan of the municipality. Or building new markets with special architectural style that combines authenticity and nobility of the past and present, according to the ancient architectural style, previously used by the ancestors in Saudi Arabia, and this is the purpose of research.

**KEY WORDS:** Stone, Taif Stone, Rocks, Sustainability

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### I. INTRODUCTION

Taif is characterized like other governorates of the kingdom of Saudi Arabia in many buildings and castles and ancient palaces that built of stones and rocks that brought from stone quarries and mountains at the area of Taif city, this stones is characterized in hardness, and dark brown colour, and darkening italics, in addition to its irregular shapes, where these buildings were built in very wonderful and beautiful way, in fact these buildings deserves our care and attention in order to keep them and their identity as a legacy of our ancestors. There is no any doubt that these locations and old stone buildings and castles will lose and disappear later in case we don't any action to aware people in order to maintaining such locations. So this present article focuses on conditions for buildings.

### II. TRADITIONAL RATIONAL PLANNIN

Sustainable development [9] is 'a process of change in which exploitation of resources. Planning for the future is a way of achieving a collective desire and common will, most countries of the world still using the traditional planning in their life, especially when they build the outer walls of their castles or villas, and to leave the fingerprints old styles to appear on the new buildings, by using the traditional ordinary stone, which add to buildings the combination between past and present. Most recent and modern buildings in Taif city unfortunately they use different kinds such as an artificial stone, granite, porcelain or marbles, Note that the city of Taif contains a lot of huge and rich sites of stones which used by ancestors in the construction of their homes and castles. These buildings and castles still bear witness to the nobility of what was enjoyed by parents and grandparents of experience and knowledge in construction despite the lack of possibilities, but it cover and suit with the whole environmental These photos show the aesthetic side of some old castles and buildings for Taif city, so the planning process has long been considered as a methodical and rational process, and the follow up of the process of planning in our buildings in order to preserve the old style of Saudi buildings, in addition to reduce the disbursements cost of raw materials in the constructions and to get more

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benefit from the stone quarries such as gravels, fine and coarse aggregate, pebbles and so on. In general we can say that Taif stone has a lot of different components and minerals, and different quality and colours, it has stone such as green and gray slate taking into account the specifications that must be met when selecting the appropriate building stone for building process, and there are some essential laboratories tests should be done such as Absorption Ratio that should be less than 3%, Specific Density [1] should be not more 2600 kg/m<sup>3</sup>, Durability around 600-800 kg/cm<sup>3</sup>, and Specific Weight should be more than 2.3 g/cm<sup>3</sup>, this ratio may change upon to Saudi Classifications, of course this is condition is very important for establishing buildings, but not necessary for external walls and decorations. Even the artificial stone should have same classifications, the natural stone it's also can be formed up onto your design requirements, and these are some different shapes for building stone.

## 2.1 Research Objectives

A wide variety of stones exist on the market, both foreign and domestic, and these can be drastically different in density, hardness, porosity, and aesthetics. The main objectives of this research is to rebuild confidence in the authenticity and splendour of the old building were used in past century in Taif and other Saudi cities. Like courthouses, mosques, dams, public buildings, castles, palaces, houses. However, you'll also find a barns, even landscape, so the aim is and to encourage officials, engineers and to maintain this architectural heritage and reconsider his glory, and to remind others, such as.

- 1- Remind the engineer's in general architectural and constructional design of the use of geological materials in building.
- 2- Encourage general observers to look at the stone in buildings they visit.
- 3- Encourage people, architects and builders to remember the local stone as building material when they plan their work.
- 4- To acquaint the local engineers, officials and geologists with some of unexpected uses of geological materials that have different types and shapes of building stones that founded in Saudi Arabia. And finally.
- 5- In case we apply what we aimed, in this case will keep our heritage style of buildings which was use in the past, and will keep the country clean and reduce pollution, in addition to develop the economic situation. This will contribute to an increase in tourist attractions, especially that the city of Taif very close to Mecca, this rational planning should achieve the sustainability system as shown below in the figure (1)

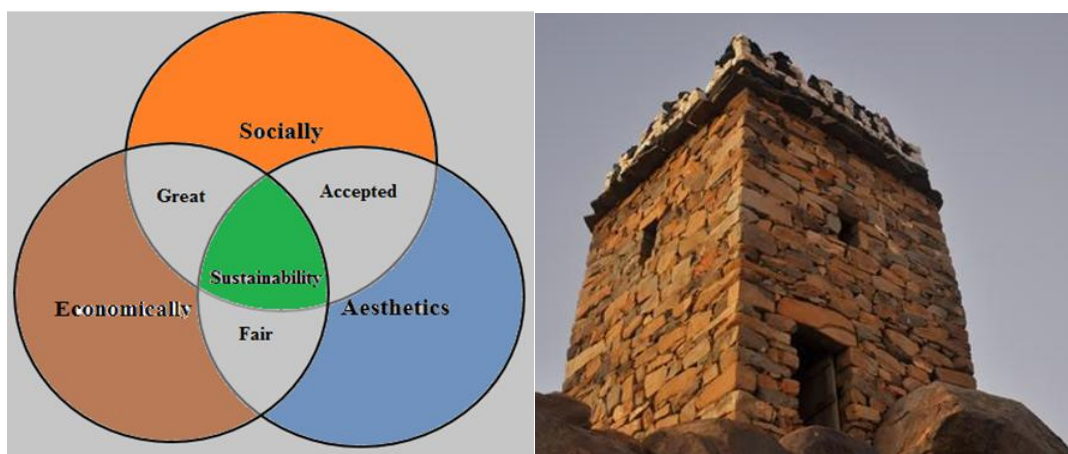


Fig -1 Diagram Achieve Sustainability-by the Author Fig – 2 Old Structure in Taif build by Stone

The following figures shown the different uses and the methods of establishing different structures such as houses or castles and so on as mentions down in the figures 2, 3, and 4.

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Fig – 3 Old House in Taif Fig – 4 Arch & Column by Stone Structure

### 2.2 Study Cases at Taif City:

Upon to the field study to some different locations in Taif, and according to the traditions of rolling stock in local community in Taif and upon to this study that shown that most people likes vast buildings which built of stone, but because of the lack of such local stone to support them, but because of the lack of such local stone to support them, they are looking for different lower in cost alternatives. While stones were locally produced or imported, generally needs more experience in building process, that mean will increase the cost of installation, because it needs special mechanical tools and ways for building, In addition, it needs time and skill in composition, It is not possible to use any of the formats of artificial stone for building process, and it needs specific designs commensurate with use. In general we say that stone use in different application as shown. The Common Building Applications for stone are:

- 1) Cladding (exterior/interior).
- 2) Landscaping.
- 3) Paving.
- 4) Flooring.
- 5) Coping.
- 6) Statuary.

So users should verify that the stone they plan to use is applicable to the demands of the project and has a successful history in such installations. It can also use for different purposes, such as walls, floor, retaining walls, ceiling, columns, stairs, since it has great strength of cohesion between stone and brick, and good isolation. It can be carried out by the sculpture and shaping operations. In China they were used special kind of small normal stones pieces in parks for foot treatment. And the possibility of completion of construction in both mechanical and traditional methods, where construction way depends on the size of the stone. In addition to possibility of cleaning stone after a period of time by using some mechanical methods, and most of these figures shown that all of the full fill the requirements of sustainability, such as the socially side, aesthetics, and the economically side, that all of them in other acceptable condictions, as fair, good, and accepted.

### III. THE SPECIFICATIONS OF THE NATURAL BUILDING STONE

Taif has different location for stone that have different quality, in general the specification of the building stone should follow the following conditions.

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1. Strength & Durability: The more compact grained and heavier the stone is more hardness.
2. Sunlight: When some stones are used in exterior applications and exposed to direct sunlight they fade or change colour.
3. Moisture: Some stones have moisture sensitive mineral contents that will cause the stone to develop rust spots, or other colour variations, or contain moisture sensitive substances that will cause blotchy and streaking discolorations.
4. Porosity & Permeability: Porosity is the ratio of pores (micro-voids) in the stone, to its total solid volume.
5. Hardness & weathering: Hardness is the property of a material to avoid and resist scratching.
6. Water absorption and frost resistance: Moisture from rain, snow or other environmental conditions penetrates the wall leading to cracks, efflorescence, rust staining, and wood rotting, paint peeling, darkening of masonry. The perfect sealing of a masonry wall surface is almost impossible since fine cracks and joints will allow the passage of water into the wall.
7. Absorbency: It is the result of these two properties (permeability and porosity). Absorbency is an important determining factor in stones sensitivity to stains. The size of the pores, their orientation, how well they are networked and the type of finish the stone has are important contributing factors to a stones overall absorbency.

## IV. CONCLUSION

Upon to the analysing result of the questionnaire the result was indicate that most people like such kind of building and they are willing to preserve the legacy of ancestors even to keep it clear and evident in their lives. Which withstands the weather fluctuations, especially at higher temperatures without using any kind of technique as conditions, most people immigrate such kind of stone because of the coast and there is no any. There are no any company care or have an interest in providing and producing such kind of stone because of high land prices, as well as the cost of manufacturing. These quarries need to license from the official authorities after confirming the loss of such quarries may contain valuable materials, which also hinders thinking even in the production process.

## V. RECOMMONDATIONS

Upon to the conclusion I recommend the following.

1. The most important recommendations is to make the design pattern confirmed by official bodies that impose the use of local stone, as well as taking into account the traditional design pattern of Saudi heritage.
2. Maintaining the old stone buildings, and restoration of such buildings, during highlights the beauty of the old buildings that were inhabited by ancestors in the past, and the architectural pattern used.
3. Adoption of Architectural Saudi urban areas using the old Saudi Stone.
4. Showing different samples of traditional Saudi stone in the local markets in trade fairs, by using different ways of show.

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