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The Attributes of Concrete Produced by using of Aljufra and Sirte Aggregate

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Abstract: ***This study was to know some of the mechanical characteristics of the two types of aggregate at different rates used in the central region in Libya (the aggregate of the Sirte limestone, Ruins of volcanic Aljufra) impact on resisting pressure and concrete floats after testing available led the research results to the following conclusion: Knowledge of the mechanical characteristics of the aggregate help in determining the validity of the use of the most suitable places for use and the results indicate that the aggregate of Aljufra is mechanical properties best in terms of the percentage of low absorption compared to the Sandbank Sirte containing the pores more than weaken its resistance to pressure the stretching, also Aljufra aggregate gave the highest results from shock hand land resistance is therefore more appropriately mixture prone to crash land concrete factories, warehouses and roads. It is during the tests results gave the samples containing the ruins of Aljufra more resistant to pressure from the samples containing the aggregate of the Sirte this can be explained by the fact that the aggregate of the Sirte contains pores more which affected the quantity of water to Hydration of cement. The results showed also that concrete with sandbank Aljufra more resistant tensile strength of the samples containing the ruins of Sirte, this can be ascribed to the surface roughness wreck Aljufra compared sandbank Sirte. It is during the tests results gave the samples containing the aggregate by 16% more resistant to pressure the stretching of samples containing the ruins of 32% of the amalgam concrete blocks which is expected the lack of article predators known as hyaenodontids between particles of aggregate.***

Keywords: Aggregate, quarries, Sirte, Aljufra, Libya

1. Introduction

Is the natural wealth around the world is one of the basic pillars underlying any state in the areas of development, and that is why it is important to develop ways to remove it and marketing properly. In Libya, it is expected that the State is witnessing rapid growth in the construction sector and industry facilities in the next few years. Where there is an urgent need to compensate the physical recession throughout the last decades, especially in the sector of residential buildings. This development necessary to meet the requirements of the market in sufficient quantities of construction materials of quality, performance and timely manner to accommodate this urbanization hoped. On top of these requirements come rock resources (aggregate) available in huge quantities in Libya.

The quality and characteristics of the rough aggregate and soft-toned has a great effect on the behaviour of the concrete situation in the Committee and solid because it holds **75** percent of the total size of the concrete. Where the aggregate is of the utmost importance and is responsible for determining the power and performance of durability concrete and improve the operating feature and resist the tension arm and pressure. That is why the trend to study the best kinds of rough aggregate we have available to avoid the use of the pile of coarse quality less.

2. Objective

The present paper is to identify and compare the attributes of the aggregate from two different sources (a quarry at Sirte limestone-quarry volcanic Aljufra) and the impact of this on the quality of the hard concrete for concrete high-resistance and match the specifications by using more than one source earth tumults and its addendum at different rates mix concrete.

3. The materials used

3.1 Water

The use of drinking water net free from the impurities for the purpose of mixing and address concrete samples.

3.2 Cement

Use normal portland cement commonly used and the product locally within the Libyan specifications. Test the softness of cement using save No. 200, the proportion was reserved for 19.1%, which coincides with US specifications ASTM C 150

3.3 Fine Sand

In this study used the sedimentary natural sand brought from Wadan city for its quality and high resistance to give it the sand after 28 day of casting. Table 1 shows the save analysis.

Table 1: Save analysis of Fine Sand

Save NO (mm)	*Passing 20-37 (%)*
2.5	99.84
1.25	99.67
0.63	99.23
0.31	44.835
0.16	26.35
Pan	8.8

3.4 Aggregate

Aggregate used in this search is from two sources (a quarry at Sirte limestone and quarry volcanic Aljufra).

4. Concrete mixture

To maintains the quality of aggregate, tested samples of aggregate different source to inspect of the physical characteristics , mechanical characteristics and comparison of frontiers in specifications. Then was the preparation of the two types of concrete mixtures of each type of rough aggregate according to the source of the aggregate of the user has been named mixtures according to the type of aggregate user rough.

It is these mixtures was poured 24 cubes of concrete by size (150mm x 150mm x 150mm) to test the resistance pressure [4], as well as have been pouring 24 concrete cylinder (150mm x 300mm) to test the resistance of the tension in the others [5]. Mixed samples then poured concrete at three layers and vibrated by vibration mechanical for 10 seconds each layer. Then, only rooftop terrace and left samples in the air inside the lab one day, after the templates and flooded the cubes and drums in the water for 7 and 28 on for the purpose of treatment. Table 2 shows the concrete mixtures of the subject of the study.

Table 2: Concrete mixtures Used

Sample	*Cement*	*Sand*	*Aggregate*		*W/C %*
			Aljufra	*Sirte*	
Sirte (standard)	*1*	*2*	*0*	*2.5*	*0.65*
Sirte (16%)	*1*	*2*	*0*	*2.9*	*0.65*
Sirte (32%)	*1*	*2*	*0*	*3.3*	*0.65*
Aljufra (standard)	*1*	*2*	*2.5*	*0*	*0.65*
Aljufra (16%)	*1*	*2*	*2.9*	*0*	*0.65*
Aljufra (32%)	*1*	*2*	*3.3*	*0*	*0.65*

5. Results and Discussion

5.1 Tests of Aggregate

Table 3 shows the result of mechanical tests of aggregate samples.

Table 3: Mechanical Tests of Aggregate

The Type of Testing	*Aggregate*		*Limit*	*Specifications*
	Sirte	*Aljufra*		
Specific Absorption Rate %	*1.97*	*1.3*	*Less than 2 %*	*ASTM C128/ C127 [6,7]*
Qualitative weight	*2.5*	*2.69*	*Greater than 2.6*	*ASTM C128/ C127 [6,7]*
Los Angeles %	*20*	*17.8*	*No more than 30%*	*ASTM C131/C 535 [8,9]*
Collision Factor %	*35*	*27*	*No more than 30%*	*BS 812 Part 2: 112 [10]*
Coefficient of Crushing %	*22.9*	*17.8*	*No more than 45*	*BS 812 Part 2: 110*

- **Specific absorption rate and qualitative weight test:** The result has shown that the proportion of water sink Sirte aggregate is higher than Aljufra aggregate. But it remained both types of aggregate within specifications as indicated in the Table 3. Also, weight values qualitative development of two types of aggregate within the American specifications. In other words, can be summarized that the Aljufra aggregate heavier than Sirte aggregate porous and absorb less.

- **Los angeles test:** Collision factor and Coefficient of crushing test qualitative remained the aggregate within specifications collision transactions, boomerangs and resist the road. The results indicate that the aggregate of Aljufra more solid and the most suitable for use in concrete prestressing and which are subjected to the severest such as friction and erosion. The result as shown in Table 3.

- **Microscopic examination results:**

1) **The regular Lens**: In both cases the aggregate is uneven and many corners which needs to water and cement and more. The aggregate of the Sirte rooftop smoother and more of aggregate Aljufra which reduces the amount of water required concrete mix.

Figure 1: Sirt aggregate.

Figure 2: Aljufra aggregate

2) **Zoom lens 10x:** The exterior surface of the Sirte aggregate unlike the aggregate of Aljufra. So, Many vents at the surface of the Sirte aggregate more than Aljufra aggregate. These sediments and vent may operate as tier buffer between the aggregate and cement in the fresh concrete which may affect the quality of the concrete.

Figure 3: Sirt aggregate (10x).

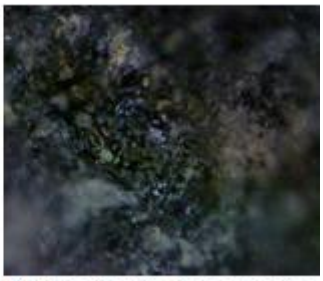

Figure 4: Aljufra aggregate (10x)

3) **Zoom lens 20x:** The aggregate of the Sirte features a blend of colors representing many constituent metals rocks mother during sedimentation. The aggregate of Aljufra black colour bold resulting from the volcanic rocks.

Figure 5: Sirt aggregate (20x)

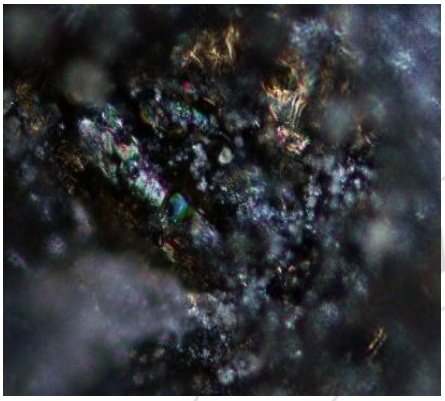

Figure 6: Aljufra aggregate (20x)

4) **Slump Test:** Table 4 shows the results of slump test fresh concrete incarnated samples aggregate (Sirte, Aljufra). Given productive mixtures using the aggregate of the Sirte less fall. Perhaps this explains the proportion of high suction Sirte aggregate if compared by Aljufra aggregate. But the rest of All mixtures within the flaccid strength and did not affect significantly the characteristics of the landing mix fresh concrete.

Table 4: Slump test of fresh concrete

Sample	*oaggregate of Sirte (mm)*	*Aljufra aggregate (mm)*	*The proportion of the difference in landing (%)*
Standard	*95*	*100*	*5.0*
16 % aggregate	*90*	*90*	*0.0*
32% aggregate	*88*	*95*	*7.4*

6. Hardened concrete tests

6.1 Compressive test

This includes the results of the tests of resisting pressure of the samples containing the aggregate of Sirte and Aljufra aggregate after curing water at the age of 7 and 28 days. In general, the results indicate that the resistance of the pressure in Table 5, the samples containing the aggregate of Aljufra is higher than Sirte aggregate.

Also, the results proved that the rate increased in resisting pressure in cubes that contain 32% from Aljufra aggregate in concrete mixture less than cubes containing of 16%. On the other hand ,the result of the concrete containing Sirte aggregate there is not too much defferent between 32% and 16%.

Table 5: Result of Compressive Test

Sample	*Age (Day)*	*average (N/mm2)*	*The rate of increase in resisting pressure from age 7 to age 28 on*
Sirte (standard)	7	21.64	29.07%
	28	30.52	
Sirte (16%)	7	27.63	12.26%
	28	31.49	
Sirte (32%)	7	27.35	12.09%
	28	31.11	
Aljufra (standard)	7	31.29	13.61%
	28	36.22	
Aljufra (16%)	7	41.93	3.61%
	28	43.5	
Aljufra (32%)	7	32.32	95.7%
	28	35.11	

6.2 Test the tensile strength of indirect

This resistance of concrete tensile strength of the samples containing the aggregate of Sirte and Aljufra aggregate after curing water at the age of 7 and 28 days. Tble 6 showes the result of the test.

Table 6: Result of Tension Test

Sample	*Age (Day)*	*average (N/mm2)*	*The rate of increase in resisting pressure from age 7 to age 28 on*
Sirte (standard)	7	1.59	35.37%
	28	2.46	
Sirte (16%)	7	1.67	11.17%
	28	1.88	
Sirte (32%)	7	1.52	12.09%
	28	1.71	
Aljufra (standard)	7	1.66	11.11%
	28	2.83	
Aljufra (16%)	7	1.64	41.43%
	28	2.8	
Aljufra (32%)	7	1.54	4.94%
	28	1.62	

Concrete as known is Weak tensile strength considered from the value of carrying concrete tensile strength of about (8%) to (12%) of compressive strength. through the recorded results turned out to be the value of the tensile strength of the samples containing the aggregate of AlJufrah volcanic higher than that contains the aggregate of Sirte Sedimentary. Also, the increase in the proportion of aggregates used in the concrete mix is inversely proportional to non-direct tensile resistance.

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