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| **Project Name :**  **Mechanical and durability Behavior of fiber reinforced concrete incorporating deferent types of natural, pp and steel fibers**  Study the effect of different types of fibers on the strength and durability of ordinary concrete using :   1. Natural palm tree fibers (DPF) L=60 mm , Dia=varying (L/d =--)- density =920kg/m3 2. Polypropylene fibers L=12 mm , Dia=varying (L/d =--) DCP –Alriadth-KSA-Density = 910kg/m3 3. Steel fibers (forcetech comp. )= L=60 mm , Dia=0.75 mm (L/d =80)--Density =7850kg/m3 4. Vf= 0, 0.2%, 0.6 %,1%   **Quantities in Kg per m3** | | | | | | | | | | | |
| **Mix ID** | **Cement**  **(kg)** | **Coarse  Aggregate**  **(kg)** | **Fine  Aggregate**  **(kg)** | **Total (W/C) ratio** | **Total  Water**  **(kg)** | **Vf\*** | **Super Plasticizer 0.5%** | **Steel  Fiber**  **(kg)** | **Palm Data  Fiber (kg)** | **PP Fiber**  **(kg)** | **Fresh Density kg/m3** |
| **M0-Control** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0 | 2 | 0 | 0 | 0 | 2420.73 |
| **SF= Steel fiber** | | | | | | | | | | | |
| **M1-SF-0.2** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0.2 | 2 | 15.7 | - | - | 2436.43 |
| **M2-SF-0.6** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0.6 | 2 | 47.1 | - | - | 2467.83 |
| **M3-SF-1** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 1 | 2 | 78.5 | - | - | 2499.23 |
| **DPE= Date Palm Fiber** | | | | | | | | | | | |
| **M4-DPF-0.2** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0.2 | 2 | - | 1.84 | - | 2422.57 |
| **M5-DPF-0.6** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0.6 | 2 | - | 5.52 | - | 2426.25 |
| **M6-DPF-1** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 1 | 2 | - | 9.2 | - | 2429.93 |
| **PPE= Polypropylene Fiber** | | | | | | | | | | | |
| **M7-PPF-0.2** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0.2 | 2 | - | - | 1.82 | 2422.55 |
| **M8-PPF-0.6** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 0.6 | 2 | - | - | 5.46 | 2426.19 |
| **M9-PPF-1** | 400 | 1105.4 | 736.93 | 0.441 | 176.4 | 1 | 2 | - | - | 9.1 | 2429.83 |
|  | | | | | | | | | | | |

**Vf\* = Volume fraction**

* The main aim to investigate the effect of 3 different types of fibers in ordinary concrete under cyclic exposure of heat-cool and wet-dry
* Control mix Noted in table above as M0-Control
* Three dosage of fibers were used as shown in red color column above (volume fraction of 0.2 -0.6 -1 % for each type of fibers )
* Steel fibers (SF ) brought from one company ( details of steel fibers I will provide later)
* DPE= Date Palm Fiber brought from local area in Najran city from the leave of the palm tree ( details of steel fibers I will provide later)
* PPE= Polypropylene Fiber ) brought from one company ( details of steel fibers I will provide later)
* All specimen tested from 28 days normal water curing and 6 months exposure to two types of exposure as follows:
* 1: heat -cool cycles for 6 months means heating in the oven for 60 degree for 2 days in the oven and then cooling at room temperature for another 2 days ( for all 9 mixes and each mix contains 3 specimens)
* 2: wet-dry cycles for 6 months means putting the specimens from for 2 days in very aggressive salts solution ( details later) and then drying at room temperature after removing from the salt solution for another 2 days ( for all 9 mixes and each mix contains 3 specimens)
* All the test is shown in the excel files separately for : A: 28days normal water curing ,B: 6 months heat-cool cycles , C: 6 months wet-dry cycles

**All tests conducted is shown below for 28daysMPa**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mix ID** | **Compressive**  **MPa** | **Flexure**  **MPa** | **USPV**  **km/sec.** | **Hardened Density**  **kg/m3** | **Water Permeability**  **depth in cm** | **Water absorption**  **%** |
|  |  |  |  |  |  |
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|

* **All tests conducted is shown below for 6 months cycles ( wet-dry and heat –cool)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Mix ID** | **Compressive**  **MPa** | **Flexure**  **MPa** | **USPV**  **km/sec.** | **Hardened Density**  **kg/m3** | **Water absorption**  **%** |
|  |  |  |  |  |

Required

1. Study the test results
2. Compare Mo with all mixes for 28 days and both cycles
3. Compare all mixes with control
4. Do precise analysis to all results and develop model if we can
5. Any other suggestion most welcome
6. There are very high amounts of information we have
7. All pictures we have have for all tests as well as from stages
8. Raw data for all flexural tests also we have