

5. Conclusions and Recommendations

5.1 Conclusions:

The aim of these research is to evaluate the effect of adding polypropylene fiber to local concrete with in Sudanese material such as : cement and aggregate . **Based on the Experimental Investigations, we found that :**

- A good Row material (Corse and Fine aggregate, Cement, admixture test or Data sheet) is a key to approve and loading the strength, that is become by satisfactory all emergence test with standard limit. Sudanese raw material were get the ASTM requirement of material .
- Type of mixing is an emergency point in PpFRC to uniform distributed which decided by the percentage of fiber added.
- Percentage of PpFRC is a very important point to get good result.
- The main advantage of PpFRC is enhance the durability and failure shape as a result of decrease shrinkage which is resulted to the magnesium of fiber to bond the matrix together and high mechanical properties which concrete gotten .
- PpF enhanced performance of concrete
- PpFRC has no sufficient effect on strength in the low percentage of PpF

In details of PpFRC properties , we observed the following :

➤ **Workability:**

- PpF enhance performance of concrete by reducing blending and segregation and plastic shrinkage
- Increase of polypropylene fibers percentage relatively decrease the workability.

- The Reduction of slump is noticed with increase in fiber content.
- **Compressive Strength:**
 - There are no significant compressive strength differences between mixes with and without polypropylene fibers.
 - The optimum percentage is 0.05 %volume of polypropylene fiber to be added to the concrete mix to increased by 8% when adding.
- **Flexure Strength:**
 - The Flexure strength increased gradually with increase of polypropylene fiber content.
 - The optimum percentage of polypropylene to be added to the concrete mix to increase the Flexure strength is 0.30 %.
- **Failure:**
 - The addition of polypropylene fibers has a significant effect on the mode and mechanism of failure concrete, it become a gradual and ductile failure.

Generally , we concluded from these research to :

- ❖ PpFRC in low percentage volume can be used mainly to resistance plastic shrinkage crack specially in hot weather like Sudan , after be sure that the percentage of PpF is suitable, and have enhanced the strength or at least do not reduce workability and strength specially compressive strength which is the most important properties of concrete .

5.2 Recommendations

5.2.1 Recommendations from the Study :

- Select the percentage of PpF is very important point which decided his properties of PpFRC
- Be careful at mixing process Fiber .
- 0.30% of PpF and above of PpFRC difficult to use without use super plasticizer.
- Reduce the workability can be indicator reduce compressive strength
- Flexure strength depend on the bond between the matrix which improved by adding fibers
- Generally ,The best percentage of PpF is 0.05% volume which enhance both fresh and hard properties of concrete .

5.2.2 Recommendations for the research follow-up :

- Study the high volume percentage and his effect in concrete.
- Compare between low and high volume fiber (PpFRC) in properties (strength) and economic use case study.
- Study the possibility of retain mesh (Secondary) reinforcement in concrete element by use PpRC.
- Try to study other kind of fiber such as : neutral fiber from sugar scrap or remnants and then compare between the deferent types manly in properties and then economic side to concluded to the most satiable one in Sudan.