

Effect of Polycarboxylate Ether on Properties of Ready mix concrete plant waste concrete as a aggregate Concrete (RMWCA)

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Abstract : Polycarboxylate Ether which is usually recognized as high water reducers are compound admixtures used in concrete. The chemical compound is required to preserve a key separation from atom seclusion, and to enhance the flow qualities of concrete. Flocculation of bond particles appear in a robust mix besides Polycarboxylate Ether which decreases the performance of concrete, anyway for a similar water - stable extent there is a uniform flow of bond particles for a strong combine with Polycarboxylate Ether. This paper is an examination of the effect of three one of a kind varieties of Polycarboxylate Ether specifically: Poly Carboxyl ate Ether (PCE), Sulphonate Naphthalene Formaldehyde (SNF), and Modified Poly Carboxyl ate Ether (MPCE) on the usefulness with mechanical residences of Ready mixture stable plant squander concrete as a total Concrete

Keywords - Plasticizer, Polycarboxylate Ether, Retention, Self- compacting concrete, Sulphonated Naphthalene Formaldehyde, Polycarboxylate Ether, Admixture, Modified Poly Carboxyl ate Ether

INTRODUCTION

Polycarboxylate Ethers constitute of a generally new class and overhauled understanding of plasticizer, the utilization of which is made in Germany, Japan and China amidst 1962 and 1974, autonomously. Misleadingly fascinating in association with standard phthalate. The utilization of phthalate licenses decreasing water a degree to 35% without diminishing the usefulness rather than the conceivable lessening up to 15% if there should be an occasion of phthalate. There are distinctive Polycarboxylate Ethers accessible in the market, out of which three Polycarboxylate Ethers will be utilized as a bit of this examination to think about their impact on usefulness mechanical property of solid blend in both new and solidified state. Polycarboxylate Ethers make a homogeneous, strong cement by and large with no partiality for withdrawal and kicking the pail. Sulphonate Naphthalene Formaldehyde (SNF) is a chemical compound passed on by consolidated chemical compoundisation of naphthalene, sulphonic dangerous with formaldehyde. The scattering of bond particles caused because of negative charge left on the admixture adsorbed strong the other strong particles. This considers is called electrostatic terribleness.

Poly Carboxylate Ether (PCE) is made out of a methoxy-polyethylene glycol chemical compound (side chain) joined with meth acrylic damaging chemical compound. The scattering of bond element happen due to satiric hindrance. Steris square relies on the length of real chain, extent and number of side chain. In any case, they are more delicate to overdosing, and can actuate issues, for example, obstacle and extraordinary air entrainment. Altered Carboxyl ate ether (MPCE) is the adjusted change of PCE by improved water holding properties. Thickness changing manager or consistency refreshing genius are routinely used to enhance the cohesiveness and relentlessness of Arranged mix strong plant misuse concrete as an aggregate Bond (RWCA) Regardless, in the Polycarboxylate Ethers utilized as a bit of this examination the thickness adjusting geniuses are joined near to the compound admixture the substance makers

II. SIGNIFICANCE OF RESEARCH

An examination on the direct specific strong mix with different Polycarboxylate Ether can exhibit the relative view on the lead of the assorted Polycarboxylate Ether used. Table 1 gives the properties of the Polycarboxylate Ethers used as a piece of this examination

TABLE 1 PROPERTIES OF SUPERPLASTICIZERS USED

| SL.No | Name of the admixture | Relative density | Colour | Dosage [*] |
|-------|-----------------------|------------------|--------------|---------------------|
| 1 | SNF | 1.25 at 25°C | Dark Brown | 0.5-2% |
| 2. | PCE | 1.09 at 25°C | Honey Brown | 0.4-1.2% |
| 3. | MPCE | 1.09 at 25°C | Golden Brown | 0.6-1.2% |

The tests with comparative revise done on the RWCA mixture are for the following:

- Concrete Compressive strength
- Slump flow experiment for workability
- Workability retention experiment of concrete
- Slump flow test at T500mm for workability

- V-funnel experiment for workability
- V-funnel experiment at T5mins for workability
- L-box test for workability
- U-box experiment
- Rapid chloride infiltration test (RCPT)
- Concrete Cost

A concrete mix up can be only classify as RWCA if it satisfies the subsequent uniqueness:

TABLE 2 EXPERIMENT TO REALIZE THE FILLING ABILITY, FLEETING ABILITY AND SEPARATION RESISTANCE FOR READY MIX CONCRETE

| Method | Property |
|-----------------------------|------------------------|
| Slump flow experiment | Filling ability |
| T50cm slump flow experiment | Filling ability |
| V – funnel | Filling ability |
| V – funnel at T5minutes | Segregation resistance |
| L – Box experiment | Passing ability |
| U – Box experiment | Passing ability |

III. TEST PROCEDURES

3.1 Slump flow experiment

The hang stream test be complete to get to the level stream of bond without check. It is most by and large used experiment and gives extraordinary evaluation of satisfying limit. The test moreover indicates insurance of self-compacting strong mix to isolation. Around 16 kilograms of strong mix was necessary for this test. Place the build plate in light of level ground. Keep the hang cone most of the way on the base plate. Fill the funnel with the scoop. Do whatever it takes not to pack. Basically beat off the strong level with the trowel. Empty the surplus strong lying on the base plate. Raise the funnel vertically and empower the strong to stream straightforwardly. Compute the last separation crosswise over of the strong in two inverse ways and figure the typical of the two. Test regards for hang stream with different Polycarboxylate Ethers are given in Table 3 and Fig.1.

TABLE 3 EXPERIMENT RESULTS OF SLUMP FLOW TEST

| Sl.No | Types of admixture used | Slump flow value |
|-------|-------------------------|------------------|
| 1. | SNF | 57 cm |
| 2. | PCE | 62 cm |
| 3. | MPCE | 81 cm |

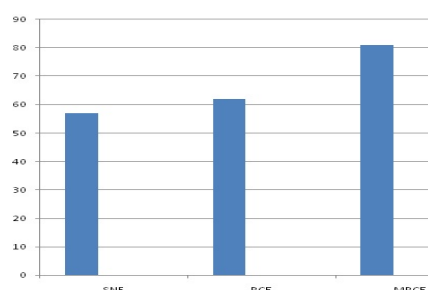


Fig. 1. difference in slump flow test value of unusual type of Polycarboxylate Ether

The higher stream regard, the more noticeable resolve be the ability to fill the formwork beneath its own weight. An estimation of no under 650mm is required for RWCA. In the event that there ought to emerge an event of outrageous separation, the majority coarse aggregate will remain in the point of convergence of the concrete and mortar and paste at the edge of bond.

3.2 T500mm droop stream test

Stream table test at T500mm demonstrates the rate of stream inside a portrayed stream divided. This test shows the satisfying furthest reaches of the RWCA. The system for this test is same concerning hang stream test. Right

| Sl.No | Name of admixture | V-Funnel experiment |
|-------|-------------------|---------------------|
| 1. | S | 53 seconds |
| 2. | P | 14.2 seconds |
| 3. | M | 14.7 seconds |

when the hang cone is lifted, begin the stop watch discover the time taken for the solid to achieve 500mm stamp. This time will called T500mm time. This infers rate of stream of security. A lesser time shows more basic flow ability of solid blend. It is suggested that T50cm time might be 2 to 5 seconds. Table 4 and Fig. 2 give the time taken to spread 500mm for the three sorts of Polycarboxylate Ether blended RWCA.

TABLE 4 EXPERIMENT VALUES FOR T500mm SLUMP FLOW TEST

| Sl.No | Name of admixture used | T500mm Slump flow value |
|-------|------------------------|-------------------------|
| 1 | SNF | 4.4 |
| 2 | PCE | 3.7 |
| 3 | MPCE | 3.4 |

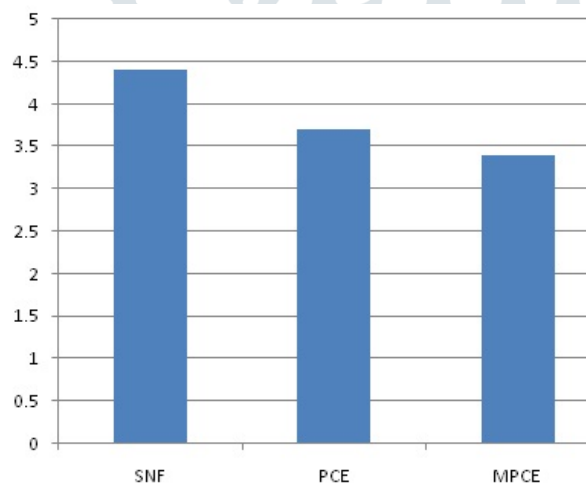


Fig. 2. Discrepancy in slump flow at T500mm for different type of Polycarboxylate Ether Fig. 2. Variation on slump flow at T500mm for different type of Polycarboxylate Ether The less time the strong mix takes to accomplish 500mm on the base plate more was the filling limit of ready mix concrete. In this way, the extra time the strong mix takes to accomplish 500mm on the base plate less is the filling limit of RWCA. In this manner, SNF gives not as much of filling limit stood out from PCE, and PCE gives not as much of filling limit diverged from MPCE.

3.3 V – Shape experiment

Equipment contains a V – shaped pipe. This test was made in Japan. The V – pipe test is used to choose the filling limit (flowability) of the strong with a major size of aggregate 20mm size. The channel is stacked with concrete (around 12 liters). We find the time taken for stream. Table 5 gives the time taken to stream the entire bond through the V-channel with different Polycarboxylate Ether development.

TABLE 5 EXPERIMENT VALUES OF V-FUNNEL TEST

| Sl.No | Name of admixture | V-Funnel experiment |
|-------|-------------------|---------------------|
| 1. | S | 53 seconds |
| 2. | P | 14.2 seconds |
| 3. | M | 14.7 seconds |

V-pipe test is a test to come across the filling limit of concrete. The lesser time the strong takes to debilitate the V– channel when the trap portal is opened, better is the filling limit of bond. Looking behavior of every one of the three Polycarboxylate Ethers in a comparative mix blueprint of concrete, SNF takes extra time than a RWCA should take, and subsequently it fails the test. However, PCE and MPCE complete

the test and PCE gives an unrivaled execution MPCE (Fig. 3)

TABLE 6 EXPERIMENT VALUES FOR V-FUNNEL ANALYSIS AT T_{5mins}

| Sl. No | Name of admixture used | V-Funnel experiment value for T _{5mins} |
|--------|------------------------|--|
| 1 | SNF | 92 |
| 2 | PCE | 18 |
| 3 | MPCE | 20 |

If the strong streams as energetically as water, by then the extent of estimations of V - pipe at T_{5minutes} ought to go between 10 – 12 seconds. The smaller the time taken, better was the filling limit concrete. However, for V channel test at T_{5 minutes} around 3 second assortment is allowed. MPCE shows better results appeared differently in relation to SNF and PCE for V-pipe test at T_{5minutes}

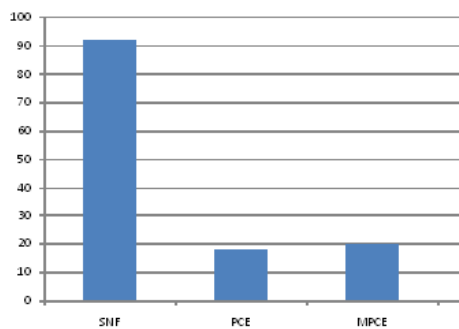
Fig. 4. Variation in V-funnel test at T_{5minutes} for form of Polycarboxylate Ether

TABLE 7 EXPERIMENT VALUE FOR L-BOX TEST

| Sl.NO | Admixture | H1 (mm) | H2 (mm) | H2/H1 |
|-------|-----------|---------|---------|-------|
| 1 | SNF | 67 | 52.24 | 0.78 |
| 2 | PCE | 79 | 74.16 | 0.94 |
| 3 | MPCE | 74 | 71 | 0.96 |

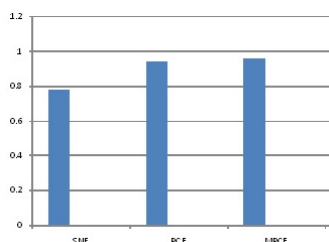


Fig. 5. Variation of L-box test used for different type of Polycarboxylate Ethers

In event that the solid streams as uninhibitedly as water, still it will be even. Along these lines, H₂/H₁ will be practically identical to 1. Thusly, closer the test respects, the blocking degree is to solidarity, the better will be the surge of bond. The European Affiliation investigate cluster proposed a base elegant estimation of 0.8 T₂₀ and T₄₀ time can give some sign of ease of stream, in any case no sensible respects have been recommended.

| Charge passed (Coulombs) | Chloride ion penetrability |
|--------------------------|----------------------------|
| >4000 | High |
| 2000 - 4000 | Moderate |
| 1000 - 2000 | Low |
| 100 - 1000 | Very low |
| <00 | ligible |

3.6 U – Box Test

U-encase test delivered Japan. The analysis is used evaluate the limit of RWCA. Mechanical gathering includes a liner which is parceled by an inside divider into two compartment showed up by R₁ & R₂. An gap by a sliding entryway is fixed between the two compartments. Fortress bars by an apparent broadness of 15 mm are presented at the passage with center to center partition 50 mm. This makes an unquestionable isolating 35 mm between the bars. The missing hand territory is stacked with around 20 kg of concrete. The portal is then lift with the strong streams to the following zone. The height of concrete with both the section is evaluated. Table 8 and Fig.6 gives the test eventual outcomes of U-box experiment for RWCA with different sorts of Polycarboxylate Ethers.

TABLE 8 RESULTS FOR U-BOX TEST

| Sl. NO. | Admixtu re | U1 (mm) | U2 (mm) | U1 – U2 |
|---------|------------|---------|---------|---------|
| 1 | SNF | 142 | 92 | 50 |
| 2 | PCE | 130 | 101 | 29 |
| 3 | MPCE | 132.5 | 104 | 28.5 |

the concrete flow without stinting as water, at rest it will be horizontal. Thus, $U1 - U2 = 0$. Then, the faster the filling rate is to zero better was the fleeing ability for concrete. The suitable value of the satisfying height is 30 mm maximum.



Fig. 6. Variation of U-box experiment for unusual type of Polycarboxylate Ether

3.7 Functionality Maintenance Test

Helpfulness of bond is a champion among the most fundamental criteria that ought to be dependably be held under wraps for long length relying leading the help time which is figured keeping the segment site and the Arranged Mixed Concrete (RMC) plant. Precisely when concrete was made arrangements for additional than M40, normally, admixture of favored decision utilized. The essential sorts of admixture that have to be utilized water decreasing experts and Polycarboxylate Ether. Right when water reducing managers are utilized, the aggregate whole free water utilized will be seen as developing release water impacts the idea of bond. For an upkeep time of around 2 hours, either a PCE or a MPCE is can be utilized. Any admixture which is a Polycarboxylate Ether cum-water diminishing expert if picked will decrease the cost of the solid. Theoretically, at first at the RMC plant, quickly after the blending of bond, a specific measure of exhausting is permitted to such an extent, to the point that the draining is gotten inside 20 – 25 minutes from the blending time of cement. As necessities be, concerning the spilling of solid which fabricates the stickiness of the straggling scraps of the material inside 20 – 25 minutes, the usefulness of cement must expansion emerged from the essential convenience and before 2 hours' over of help period; the pinned for stream ought to be refined. Along these lines, from this time forward, starting stream a force for RWCA is kept higher. Table 9, 10, 11 and Fig.7 demonstrate the handiness upkeep after some period of various sorts of Polycarboxylate Ether blended RWCA

TABLE 9 EXPERIMENTAL RESULTS SLUMP RUN VALUE OVER TIME FOR SNF

| Sl.NO | Time (Minutes) | Slump (mm) | | Average slump (mm) |
|-------|----------------|------------|-----|--------------------|
| 1 | 10 | 732 | 734 | 733 |
| 2 | 30 | 695 | 696 | 696 |
| 3 | 50 | 665 | 666 | 666 |
| 4 | 70 | 654 | 657 | 656 |
| 5 | 90 | 605 | 610 | 608 |
| 6 | 110 | 575 | 585 | 580 |
| 7 | 120 | 565 | 560 | 563 |

TABLE 10 EXPERIMENTAL SLUMP FLOW VALUE MORE THAN PERIOD FOR PCE

| Sl.NO | Time (Minutes) | Slump (mm) | | Average slump (mm) |
|-------|----------------|------------|-----|--------------------|
| 1 | 10 | 734 | 745 | 740 |
| 2 | 30 | 697 | 692 | 695 |
| 3 | 50 | 665 | 664 | 665 |
| 4 | 70 | 645 | 650 | 648 |
| 5 | 90 | 605 | 600 | 603 |
| 6 | 110 | 574 | 570 | 572 |
| 7 | 120 | 555 | 550 | 553 |

TABLE 11 EXPERIMENTAL VALUE FOR SLUMP

| Sl.NO | Time (Minutes) | Slump (mm) | | Average slump (mm) |
|-------|----------------|------------|-----|--------------------|
| 1 | 10 | 703 | 705 | 704 |
| 2 | 30 | 698 | 693 | 696 |
| 3 | 50 | 673 | 664 | 669 |
| 4 | 70 | 672 | 655 | 664 |
| 5 | 90 | 654 | 604 | 629 |
| 6 | 110 | 590 | 573 | 582 |
| 7 | 120 | 575 | 552 | 564 |

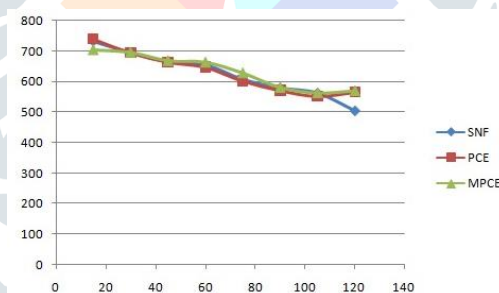


Fig. 7. Slump run results of RWCA mixture versus time period by means of different Polycarboxylate Ether

The strong makes quality with continued with hydration. The rate of get of value speedier in the first place and the charge gets diminished by means of age. This standard to expect the 28th day quality as the full nature of concrete. Yet concrete makes quality recent days. Earlier codes have not been permitting to consider that this quality in the arrangement. The development in quality recent days is used to get submerged with the factor of prosperity and make structure more mild. The underlying advance to mix plot calculation is the goal quality, according to IS 10262:2009 is given by The plan is then done utilizing the estimation of f'_{ck} , which for this situation gives an estimation of 25 MPa.

TABLE 12 RESULTS OF COMPRESSIVE STRENGTH RESULTS OF SNF

| Sl.No | Days | Weight (kg) | Ultimate Load (kN) | Strength (MPa) | Average strength (MPa) |
|-------|------|-------------|--------------------|----------------|------------------------|
| 1 | 3 | 8.365 | 235.00 | 10.44 | 9.55 |
| | | 8.324 | 203.65 | 9.05 | |
| | | 8.398 | 205.75 | 9.14 | |
| 2 | 7 | 8.395 | 365.45 | 16.24 | 15.95 |
| | | 8.412 | 352.65 | 15.67 | |
| | | 8.428 | 358.75 | 15.94 | |
| 3 | 28 | 8.445 | 584.34 | 25.97 | 25.92 |
| | | 8.461 | 581.65 | 25.85 | |
| | | 8.478 | 583.54 | 25.94 | |

TABLE 13 COMPRESSIVE STRENGTH OF PCE

| Sl.No | Days | Weight (kg) | Ultimate Load (kN) | Strength (MPa) | Average strength (MPa) |
|-------|------|-------------|--------------------|----------------|------------------------|
| 1 | 3 | 8.412 | 228.65 | 10.16 | 10.14 |
| | | 8.428 | 228.25 | 10.14 | |
| | | 8.445 | 227.84 | 10.13 | |
| 2 | 7 | 8.527 | 345.55 | 15.36 | 15.21 |
| | | 8.544 | 342.2 | 15.21 | |
| | | 8.560 | 338.85 | 15.06 | |
| 3 | 28 | 8.593 | 582.38 | 25.88 | 25.87 |
| | | 8.610 | 581.98 | 25.87 | |
| | | 8.626 | 581.58 | 25.85 | |

| Sl.No | Days | Ultimate Load (kN) | Compressive Strength (MPa) | Average Result (MPa) |
|-------|------|--------------------|----------------------------|----------------------|
| 1 | 3 | 230.68 | 10.25 | 10.23 |
| | | 230.27 | 10.23 | |
| | | 229.87 | 10.22 | |
| 2 | 7 | 315 | 14.00 | 14.02 |
| | | 325.8 | 14.48 | |
| | | 305.5 | 13.58 | |
| 3 | 28 | 578.38 | 25.71 | 25.69 |
| | | 577.98 | 25.69 | |
| | | 577.58 | 25.67 | |

TABLE 14 COMPRESSIVE STRENGTH OF MPCE

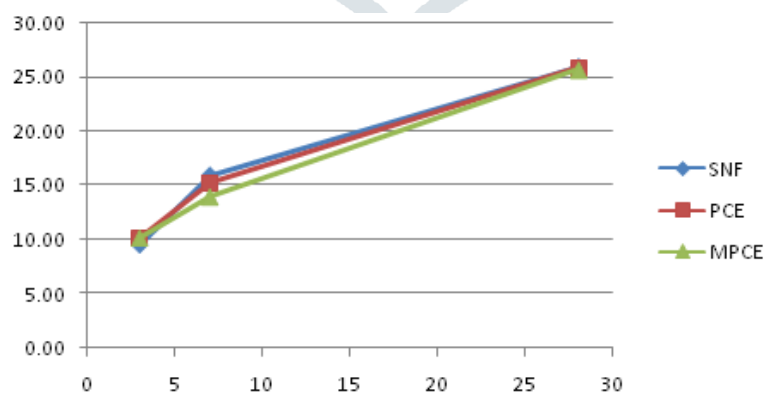


Fig. 8. Results for Compressive strength test of RWCA for different Polycarboxylate Ethers

The 28 days compressive quality qualities SNF, PCE and MPCE as acquire in the wake of testing the separate solid examples are more than the objective quality for which they were composed. Table 12, 13, 14 and Fig.8 speaks to the compressive quality improvement after some time of SNF, PCE and MPCE based self-compacting solid

3.9 Chloride Entrance Experiment

Supported solid structures are acquainted with serious conditions, yet are reliably anticipated that would last with basically zero repair or upkeep for drawn out stretches of time (a significant part of the time 100 years or more). To do this, a solid structure must

be made. One of the bona fide sorts of organic assault is chloride entrance, which prompts crumbling for the reinforcing steel with subsequent lessen on the quality, value, and style for the structure. This may incite early repair or troublesome substitution of the structure. A general framework of dismissing such breaking down is to shield chloride from entering structure the level of the reinforcing steel bars by utilizing respectably invulnerable solid (concrete containing fly slag is utilized as a bit of this case). The breaking point of chloride particles to enter the solid should then be suggested for outline and moreover quality purposes. The infiltration solid by chloride particles, regardless, is an immediate procedure. It can't be settled unmistakably in a period allocating that would be critical quality control measure. In this manner, recollecting the genuine target to evaluate chloride intrusion, a test procedure that resuscitates the system is required, to permit the affirmation of diffusing respects in a sensible time, for which speedy chloride test urges us to survey the solid made. The solid case (a 100mm partition more than, 200mm high round and void case) after 56days of reestablishing was removed from the water shower and was cut into three tantamount parts. One of the cut solid barrel test is in twisting contact with Sodium Chloride (NaCl) blueprint while the other face is in wicked contact with Sodium Hydroxide (NaOH) strategy. Table 15 of results the range of charge passing through the concrete sample and their interpretation according to the American Society for Testing and Materials (ASTM) .Table 16, 17, 18 and Fig. 9 the test results of Rapid Chloride Penetration test of RWCA with SNF, PCE and MPCE Polycarboxylate Ethers.

TABLE 15 CHARGE PASSING THROUGHOUT THE CONCRETE SAMPLE AND THEIR ACCORDING TO ASTM C 1202 CODE

| Charge passed | Chloride ion penetrability |
|---------------|----------------------------|
| > | High |
| 2000 - 4000 | Moderate |
| 1000 - 2000 | Low |
| 1 | Very low |
| < | Negligible |

TABLE 16 RAPID CHLORIDE PENETRATION TEST VALUES FOR SNF

| Sl.No | Time | Trial 1 | Trial 2 | Trial 3 |
|---------------|-------|------------------|---------|---------|
| 1 | 11:00 | 52 | 60 | 66 |
| 2 | 11:30 | 53 | 60 | 66 |
| 3 | 12:00 | 55 | 62 | 66 |
| 4 | 12:30 | 56 | 63 | 67 |
| 5 | 13:00 | 58 | 64 | 68 |
| 6 | 13:30 | 59 | 65 | 68 |
| 7 | 14:00 | 61 | 66 | 69 |
| 8 | 14:30 | 62 | 67 | 69 |
| 9 | 15:00 | 64 | 68 | 70 |
| 10 | 15:30 | 65 | 69 | 70 |
| 11 | 16:00 | 67 | 70 | 70 |
| 12 | 16:30 | 68 | 71 | 71 |
| 13 | 17:00 | 70 | 72 | 71 |
| Charge passed | | 1225.8 | 1346.1 | 1458.1 |
| Avera | | 1343.34 Coulombs | | |

TABLE 17 RRESULTS OF RAPID CHLORIDE PENETRATION TEST

| Sl.No | Time | Trial 1 | Trial 2 | Trial 3 |
|-------|-------|---------|---------|---------|
| 1 | 11:00 | 64 | 82 | 96 |
| 2 | 11:30 | 67 | 82 | 100 |
| 3 | 12:00 | 68 | 84 | 100 |
| 4 | 12:30 | 73 | 85 | 102 |
| 5 | 13:00 | 75 | 86 | 104 |
| 6 | 13:30 | 78 | 87 | 106 |
| 7 | 14:00 | 81 | 88 | 108 |
| 8 | 14:30 | 83 | 89 | 109 |
| 9 | 15:00 | 86 | 90 | 111 |
| 10 | 15:30 | 89 | 92 | 113 |
| 11 | 16:00 | 92 | 93 | 115 |
| 12 | 16:30 | 95 | 94 | 117 |

| | | | | |
|---------------|-------|-----------------|--------|--------|
| 13 | 17:00 | 97 | 95 | 118 |
| Charge passed | | 1768.5 | 1938.7 | 2342.3 |
| Average | | 2016.5 Coulombs | | |

| Sl. No | Time | Trial 1 | Trial 2 | Trial 3 |
|---------------|-------|------------------|---------|---------|
| 1 | 11:00 | 60 | 68 | 76 |
| 2 | 11:30 | 60 | 72 | 80 |
| 3 | 12:00 | 60 | 75 | 83 |
| 4 | 12:30 | 60 | 75 | 83 |
| 5 | 13:00 | 60 | 79 | 83 |
| 6 | 13:30 | 61 | 81 | 83 |
| 7 | 14:00 | 62 | 83 | 80 |
| 8 | 14:30 | 62 | 86 | 80 |
| 9 | 15:00 | 62 | 88 | 80 |
| 10 | 15:30 | 62 | 91 | 80 |
| 11 | 16:00 | 62 | 93 | 80 |
| 12 | 16:30 | 62 | 95 | 81 |
| 13 | 17:00 | 62 | 98 | 81 |
| Charge passed | | 1392.4 | 1704.7 | 1926.2 |
| Average | | 1674.43 Coulombs | | |

TABLE 18 EXPERIMENTAL RESULTS OF RAPID CHLORIDE PENETRATION TEST

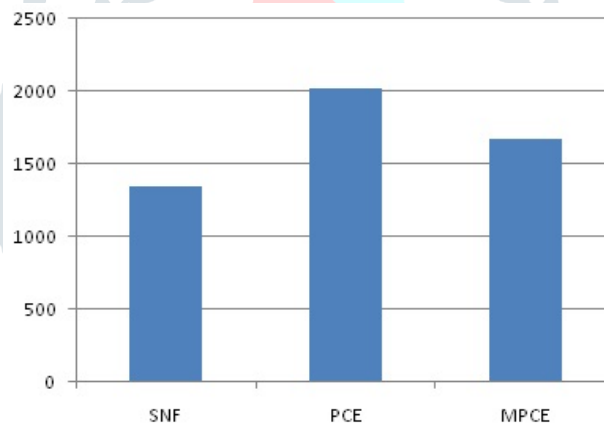


Fig. 9. Test of Rapid Chloride Penetration

Lesser the charge go over the strong case, more is the resistivity offered strong mix. In like way, when more charge is disregarded the strong illustration then the strong mix offers less insurance from chloride molecule entrance. From the test results showed up above, clearly SNF has better assurance from chloride molecule entrance appeared differently in relation to the next two RWCA mixes.

IV. CONCLUSION

The brand name direct of bond was investigated utilizing unquestionable Polycarboxylate Ether (PCE) Polycarboxylate Ethers Sulphonated Naphthalene Formaldehyde (SNF), and Changed Polycarboxylate Ether (MPCE), autonomously were considered. In addition, this territory will organize every single one of the examinations done parts together. The Table 19 shows the association in the properties of new cement in the wake of blending the solid with various Polycarboxylate Ethers. From relative examination we have discovered that SNF does not finish a few tests like V – channel experiment, V – pipe at T5 minutes experiment and U – box experiment, which are vital for demanding the crisp cement to be a RWCA. Besides, that solid when blended with this admixture the new bond performs stunningly less when emerged from the other two admixtures utilized. Regardless, the cost of SNF is lesser than the other two admixtures (about Rs60 per liter). The cost comes up to be Rs 5216 for blending one meter square of solid utilizing SNF. More finished the help in usefulness of SNF changes radically after some time.

PCE when blended with solid gives amazing outcomes. It effectively completes each test slanted to be assigned a RWCA. Regardless, the PCE is most lifted among all the three compound admixtures. The cost comes up to be Rs 5846 for blending one meter 3D condition of solid utilizing PCE. The upkeep in convenience of cement blended with PCE does not shift much with time, giving a common usefulness of bond for a more drawn out time. MPCE when blended with solid gives amazing outcomes showed up contrastingly in connection to PCE. It finishes each test recorded for fulfilling to be named a RWCA. Regardless, the cost of MPCE is

lower than PCE and superior than a SNF.

TABLE 19 RESULTS OF COMPARISON OF THE TEST RESULTS

| Sl.No | Properties | SNF | PCE | MPCE |
|-------|--|-----------|----------|-----------|
| 1. | Slump flow test | 57 cm | 62 cm | 81 cm |
| 2. | Slump flow at T _{500mm} | 4.4 sec | 3.7 sec | 3.4 sec |
| 3. | V-funnel test | 53 sec | 14.2 sec | 14.7 sec |
| 4. | V-funnel at T _{5 minutes} | 92 sec | 18 sec | 20 sec |
| 5. | L – box test | 0.78 | 0.94 | 0.96 |
| 6. | U – box test | 50mm | 29mm | 28.5mm |
| 7. | Compressive strength on 3 rd day | 9.55 MPa | 10.14MPa | 10.23MPa |
| 8. | Compressive strength on 7 th day | 15.95 MPa | 15.21MPa | 14.02 MPa |
| 9. | Compressive strength on 28 th day | 25.92MPa | 25.87MPa | 25.69MPa |
| 10. | RCPT | 1343.34 C | 2016.5 C | 1674.43 C |
| 11. | Dosage used | 1.42% | 1.2% | 0.82% |
| 12. | Cost per m ³ concrete | Rs 3216 | Rs 3246 | Rs 3116 |

REFERENCE

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