

## **Effect of Sikament – 600 on Compressive strength and workability of Concrete**

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### **Abstract:**

*This study deals with the effects of use of sikament-600 as super-plasticizer in concrete. Indigenous super-plasticizers help in the economic improvement in the concrete mix. The concrete mixes were subjected to the test of compressive strength for 7 – days and 28 – days with and without the use of sikament-600.*

*The study of the effects of different doses levels 0.5%, 1.0%, 1.5% and 2.0 % of sikament-600 was studied for compressive strength of concrete mixes for 7-days and 28-days. The cubes of standard size 150mm X 150mm were constructed and cured with good quality of water for the respective time period for avoiding the consequences on the studied compressive strength.*

*Results based on this investigation show that the addition of a normal dose of the super plasticizer sikament-600 causes the better workability with the reduced amount of water and the compressive strength of the concrete mixes gets increased when the water reduction takes place due to the addition of the sikament-600. Sikament-600 needs to be added in lesser amount than the other admixtures so the results become economic with respect to the consumption of super-plasticizer.*

**Keywords—** Super Plasticizer, mortar, concrete, sikament-600, compressive strength

### **I. INTRODUCTION**

The compressive strength of concrete and its workability are very important properties. When concrete need to be pumped while transportation, a high workability is required. To protect the reinforcement from the corrosion and quick and easy transportation, high workability plays a vital role. It helps forming a voids free and very low permeable concrete. It affects the compressive strength of concrete somehow as soon as the limit of water-cement ratio gets increased. Thus, the quantity of cement and water is adjusted accordingly in order to prepare a workable paste for availing the advantages for high workability mentioned earlier and the previous researches. While doing so, there may be faced disadvantages like segregation, shrinkage in excess, undesirable heat development and other long term unfavorable effects. These kinds of disadvantages may be triumphed over by adding the admixtures like super-plasticizers which are liable to impart high workability to concrete without escalating water-cement ratio and also can reduce the requirement of water without having consequences on workability so that high compressive strength of concrete.

Super plasticizers are the water reducing chemical admixtures which are responsible of imparting extreme workability of consistency (200mm – 250mm of slump) and conveying reduction in water requirement 20-30%.

As soon as the super plasticizer got introduced, it invited new possibilities of the use of different cement composition in construction in the country. The evolution of super plasticizers is considered to be a dramatic breakthrough which can significantly affect the use and the production of cement composition hereafter. In tropical like INDIA both the increase temperature and addition of super plasticizers cause the slump loss at the increased rate. This can be avoided and at the same time the advantages of super plasticized concrete can be obtained in tropical countries by the use of some modified super plasticizers. Some retards may be added with super plasticizers to make it suitable for tropical countries.

The super plasticizers are also being used in the cement mortars, grouts, coatings, adhesives, fiber reinforced concrete, ferro-cement etc.

Sikament-600N is a highly effective dual action liquid superplasticizer for the production of free flowing concrete or as a substantial water-reducing agent for promoting high early strengths. It imparts excellent slump retention for prolonged periods. This product is suitable for tropical and hot climatic conditions.

### **II. MATERIALS**

1. **Cement:** Grade – 53 of cement was used throughout the construction. The cement was stored in a safe place recommended in the Bureau of Indian Standard. Cement was used within 6 months.
2. **Aggregate:**
  - a. **Fine Aggregate:** Clean and fine natural sand from river bed as available I laboratory was used for the work. The fineness modulus of sand was found as 2.37 and its specific gravity as 2.70.
  - b. **Course Aggregate:** Rounded, clean, free from any type of organic impurity, hard course aggregates were used for the work.
3. **Water:** Tap water, used for drinking purpose available in the laboratory was found for mixing purposes.
4. **Properties of Sikament – 600:**

Colour:	Dark Brown
State:	Liquid
Specific Gravity:	1.22
Recommended Dose (by wt. of cement)	0.5 to 3.0



Figure 1 Sikament-600

III. OBSERVATIONS AND RESULTS

Compressive Strength of concrete before and after using Sikament – 600:

Type of Super plasticizer	Dose (% by weight of cement)	Water - Cement Ratio	Compressive Strength M Pa			
			7 - Day	7 - Day Avg.	28 - Day	28 - Day Avg.
Sikament - 600 (B)	0	0.33	21.3	21.1	35.3	34.43
			19.9		32.9	
			22.1		35.1	
	1	0.33	25.2	24.46	15.1	16.36
			24.3		16.9	
			23.9		17.1	
	2	0.33	No Setting After 24 hours		No Setting After 24 hours	

Water-Cement ratio in Concrete using different dosage of Sikament – 600:

Superplasticizer	Percentage of Dose by weight of cement	Water-Cement Ratio
Sikament - 600	0	0.69
	0.5	0.57
	1	0.53
	1.5	0.49
	2	0.41

Variation in Compressive Strength with the increasing dose of Sikament – 600

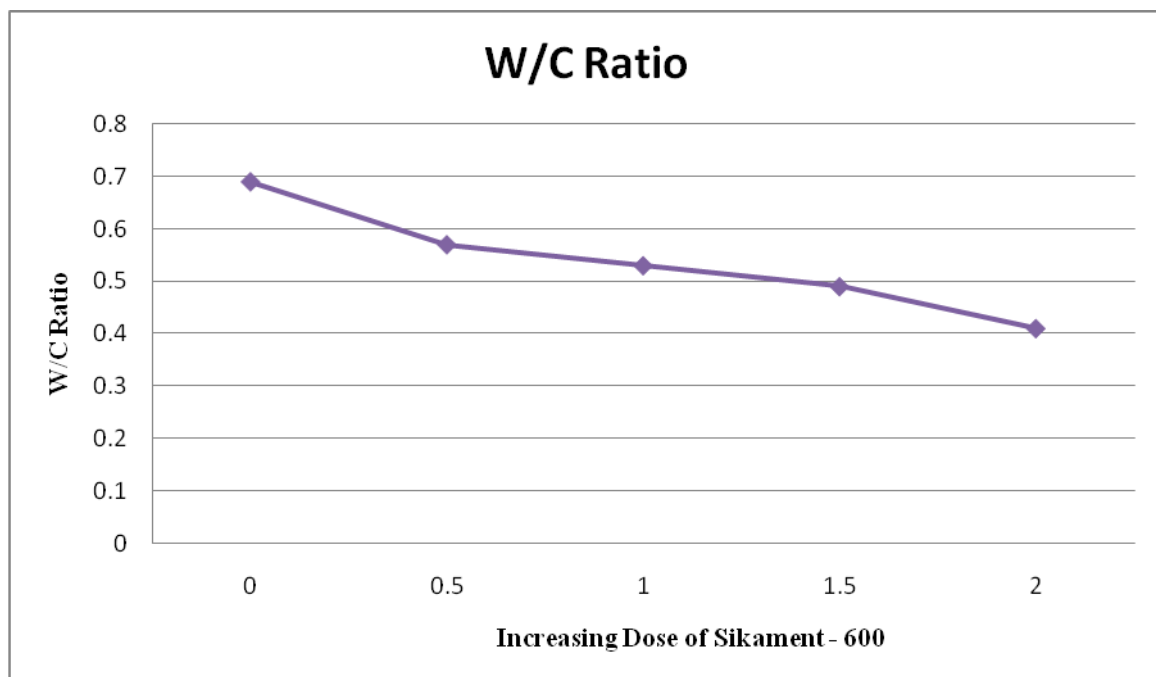


Figure 2 Decreasing water cement ratio due to Sikament-600

IV. CONCLUSION

- it is a high range water reducing and set retarding super-plasticizer.
- It is capable of reducing the water content in the range of 20-30% when used in the range of 1.0 – 2.0% by weight of cement.
- The relationship between dosage level of the super-plasticizers and the percentage of water reduction is almost linear in the range of 0.5 – 2.0% of dosage levels. In general it is noticed that excessive dosage of the super-plasticizers causes segregation of concrete.

- For sikament – 600 the dosage levels higher than 1.0 percent are not suitable because at the higher dosage the setting gets retarded.
- It can be concluded that for the same workability, sikament - 600 may be used as water reducer in cement mortar and concrete. In turn, it will cause an increase in the early strength as well as the 28 – days strength value.
- In general, the 7 – day and 28 – day compressive strength of concrete increases with the increase in dosage levels of the super-plasticizers.

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