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ANALYSIS OF PROPERTIES OF CONCRETE USING GUM BASE DISSOLVED WATER SOLUTION AS ADMIXTURE

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Abstract

Chemical admixtures are the fourth ingredient of the concrete which is inevitable for the modern concretes, the properties of concrete can be modified either in plastic and the hardened state as required. In this paper analysis of properties of concrete using gum base dissolved water solution as chemical admixture is studied and verified to strength of concrete to normal Portland cement. As chewing gum is cohesive substance composed of gum base. By using gum base solution as solution the compressive strength and tensile strength of concrete has gradually increased compared to normal concrete; this indicates that the cohesion property of gum base helps in improvement of bond strength of concrete.

Keywords: Gum Base Solution; Temperature Retardant; Admixture; Concrete Exothermal Reaction.

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1. Introduction

Chewing gum is soft cohesive substance designed to be chewed without being swallowed. Its texture is reminiscent of rubber because of the physical and chemical properties of its polymer, plasticizer and resin components, which contributes to its elastic-plastic, sticky, chewy characteristics [1].

The major composition of chewing gum is gum base and sweeteners which varies from 30 to 50% & 40 to 50% respectively. Minor components such as Glycerin, softener or plasticizer: polyol coating are used.

Polymer, including elastomers is mainly responsible for the stretchy and sticky nature. As plasticizers enhances flexibility are reduces brittleness .As the activity of water ranges 0.45-0.65,[2] the moisture content of chewing gum ranges from 3-6% [2].The chewing gum characteristics such as chewiness, stickiness, Bubble-blowing capacity, flavor release and cooling sensation are main physical and chemical characteristics . Two types of phases such as liquid phase and crystalline phase makes variation in balance of plastics and elastics properties.

As PH value of saliva in our mouth is 7, the chewing gum with PH of 5.5 causes the saliva demineralize the teeth.[3]Chewing gum after a meal replaces brushing and flossing, if that's not possible, to prevent teeth decay and increase saliva production [4]. The author has experimented by dissolving the gum base solution for mixing the concrete, as the water absorbed by cement and aggregates the gum base molecules dries up, as gum base is cohesive and hardens when moisture content reduces, thus increases bond strength of concrete.

2. Methodology

Chewing gum must be washed in water solution thoroughly as the additional color and flavor added to chewing gum must be removed so as to obtain gum base. The gum base must be dissolved in distilled water as solvent; a homogenous solution must be obtained by mixing gum base and distilled water by external forces. This solution contained vessel must be closed by lid, to prevent exposure from atmosphere and dust. While mixing concrete instead of using normal water the gum base dissolved solution will be used

Target strength of concrete was determined by the equation.

Target strength by using gum base solution= $f_{ck} = f_{ck} + 1.65(s)$ —[eq1].

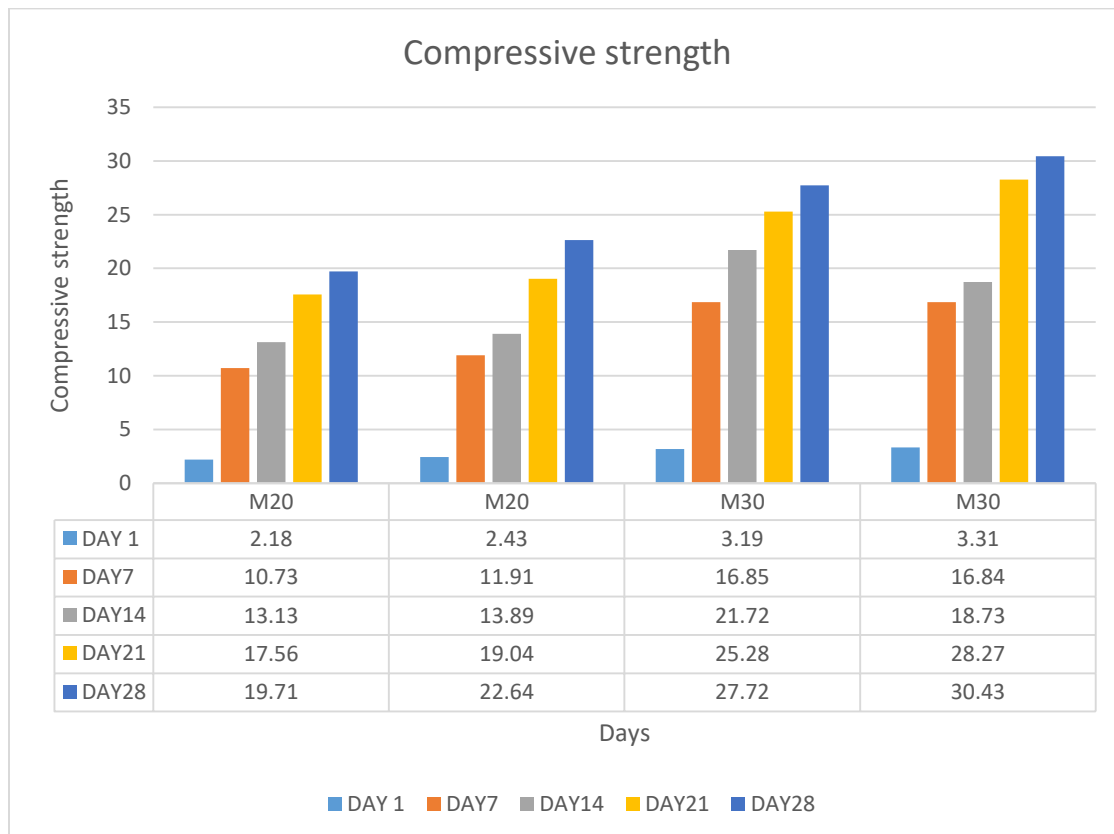
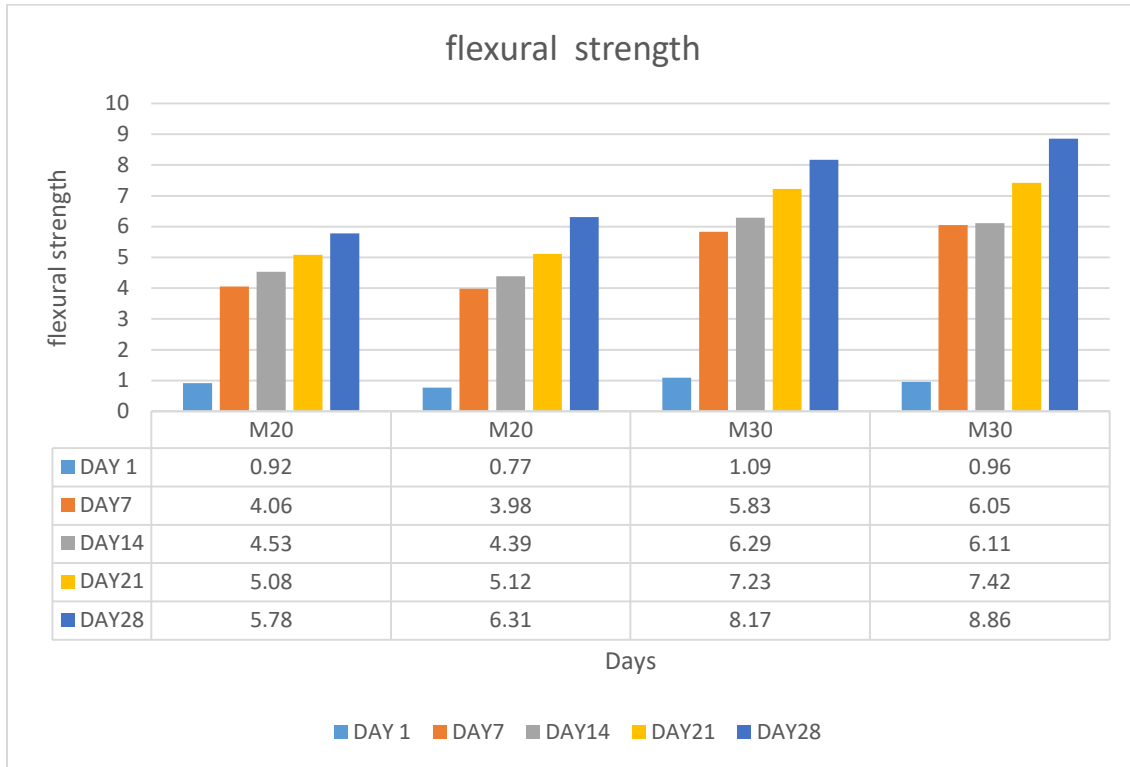
According to standard code IS10262-2009[5]

The amount of hair admixture was calculated from the following equation,

The amount of gum base solution to be added to concrete = (mass of chemical admixture/specific gravity of admixture *1000) [6]

The specific gravity of gum base solution is higher than normal water that is 1.18 by Le-Chatelier principle the cube casted for the size 15cm³. The compression and flexure strength were tested for 1, 3, 7, 21, 28 days after casting.

3. Results and Discussions



4. Conclusions & Recommendations

From fig (1), it can be observed that M20 & M30 grade of concrete with chewing gum can withstand more tensile strength 6.31 and 8.86Mpa. Compared to the normal concrete withstanding 5.78 and 8.17 Mpa of load respectively, the flexural strength capacity found increased in M20 and M30 grades of concrete by about 8.4% and 7.79% respectively.

In fig(2) showing the capacity to withstand compressive strength by sample, present study reveals that concrete cube with chewing gum added as admixture can withstand 22.64 & 30.43Mpa compared to normal concrete withstanding 19.71 Mpa and 27.72 Mpa by M20 & M30 grade respectively for 28days. This is clear that about 12.94 and 8.91% of strength has increased. Hence by using chewing gum as an admixture enhances the bondstrength in concrete to withstand more loads. Although periodically properties of chewing gum may change but it gets harder once it reaches the state of absence of water. Hence we can use chewing gum as an admixture for temporary constructions and places where water can't reach the concrete block.

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References

- [1] Estruch, RA(2008). "Gum base". In Titz.D. Formulation and production of chewing and bubble gum (2cd). Essex: Kennedy,s publications ltd: pp.93-118.
- [2] Bussiere, G.; Serpelloni, M. (1985-01-01). Simatos,D.; Mutton,J.L., eds. Properties of water in foods NATO ASI series. Springer Neitherlands. Pp.625-645. ISBN9789401087568. doi;10.1007/978-94-009-5103-7=38.
- [3] Emsley, J(2004),Vanity, Vitality and Virility. NewYork; Oxford university press pp.189-97. ISBN-19-280509-6.
- [4] Sioda,Paul "Can I chew gum". Paul Sioda Dentistry. Retrieved 2013-09-24.
- [5] Shanmugapriya T, Uma R.N: Optimum of partial replacement of M-sand by Natural Sand in high performance concrete with silica fume, 2, 2012, 75.
- [6] RamazanDemirboga, Rumstem Gul: The effect of expanded perlite aggregate, Silica fume and fly ash on the thermal conductivity of lightweight concrete: 33(5), 2003, 723-727.
- [7] Jain D. and Kothari A.: Hair fiber reinforced concrete 2012.

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