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COMPARISON DISTILLED WATER AND CASSAVA WASTE WATER AS AN ADMIXTURE SANDCRETE BLOCKS

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Abstract: The Compressive Strength of Commercially Produced Sandcrete blocks available in the material market in Nigeria fall below minimum requirements of Nigerian Industrial Standard (NIS 87:2000) 2.5N/mm^2. The purpose of this study was to develop a new sandcrete blocks made from Cassava waste water to replace Normal sandcrete blocks made from distilled water using the same materials and methods. 48 sandcrete block samples size 450mm X 150mm X 225mm were cast and controlled. The tests performed include: Sieve Analysis, Water absorption, Specific gravity and Compressive Strength. The Findings revealed that the Sandcrete blocks made from cassava waste water attained compressive strength at day 28 (4.06)N/mm^2 while the Normal distilled water sandcrete blocks attained the compressive strength at day 28 (1.03)N/mm^2. This indicates that cassava sandcrete blocks satisfy while the distilled failed to satisfy NIS 87: 2000 and BS 3921 requirement. It suggests that Cassava Sandcrete block is a durable building and construction material.
Keyword: Sieve Analysis, Water Absorption, Specific Gravity, Cassava, Compressive Strength.

I INTRODUCTION

Sandcrete block is an important building and construction material that is widely used as walling units in Nigeria, Ghana and many other countries in the World. Sandcrete blocks are composite material made up of cement, sand and water, moulded into different sizes (Borchelt, 2002). The quality of blocks produced commercially differs from one industry to the other, due to the different methods employed in the production (Dov 1991).

Sandcrete blocks are used for walling units and partitions, the sizes and weights must be conveniently dimensioned easily handled by the Artisans. Sandcrete blocks are supposed to be used for the construction of load bearing and non-load bearing structures (Hodge 1971). Therefore Load bearing blocks must conform to building and construction regulation (CODE). The present Sandcrete blocks available in building and construction material market in Nigeria are below the Nigerian Industrial Standard (NIS). The purpose of this study is to development a cassava sandcrete blocks as an alternative to distilled sandcrete blocks for load bearing and non load-loading structures or walling units. In this case the load bearing wall are those walls acting as supports for the whole structure to transmit the weight to the ground surface underneath it for stability.

1.1 Sandcrete Blocks

Sandcrete block possesses an intrinsic low compressive strength making then susceptible to any tragedy such as seismic activity. Sandcrete blocks are composite material made up of cement, sand and water, molded into different sizes (Borchelt 2002). It is widely used in Nigeria and other countries like Ghana, Irish as walling unit. The quality of blocks produced however, differs from each industry due to the different methods employed in the production and the properties of the constituent materials. They are used in the construction of walls, partitions, walling one-storey building, schools, houses and so on. The importance of sandcrete block is a locally building and construction material produced and used widely for building construction. Previous researchers have identified that commercially available sandcrete blocks in Nigeria fall below minimum compressive strength 0.5-0.97N/mm^2 which is well below 2.5N/mm^2 and 3.45N/mm^2 the NIS requirement. According to (Hodge 1971), Sandcrete blocks are available for the construction of load bearing and non-load bearing structures do not conform to building code and regulations. Sandcrete blocks have been widely used for building and construction projects in Nigeria. However it is observed that the alternate suitable clay bricks are not available in every Local Government in Nigeria. The clay bricks commercially produced presently available in the building and construction material market in Nigeria are not uniform in both quality and compressive strength. This suggests that there is a need for more improvement and control in building and construction materials in Nigeria.

1.1.1 Admixtures

According to ACI 212.3R-10, “Report on Chemical Admixtures for Concrete,” an admixture or combination of admixtures may be the only feasible way to achieve the desired performance from a concrete mixture in some

cases. There are many kinds of chemical admixtures that can function in a variety of ways to modify the chemical and physical properties of sandcrete blocks. This study exploited cassava waste water as an admixture to improve the durability and compressive strength of sandcrete blocks in Nigeria.

1.2 CASSAVA

Cassava is an important root crop in Africa, Asia, South Africa and India,providing energy for about 500 million people. Cassava roots are potentially toxic due to the presence of cyanogenic glycosides especially Linamarin. Physiological deterioration occurs in cassava roots, 2-5 days after harvesting followed by microbial deterioration 3-5 days later. Cassava farming population has empirically developed several processing methods for stabilizing cassava and reducing its toxicity. Additionally the roots contain large quantities of the anti-nutrient factor cyanide and it changes in cassava into cyanogenic glycosides, linamarin and lotaustralin. Fermentation of cassava processes uses local technology without mechanical energy support or requirement it is basically physical energy. During the fermentation there is disintegration of tissue structure results of linamarin with linamarase; which is located in the cell walls and subsequent hydrolysis to glucose and cyanohydrins, which easily breakdown to ketone and hydrocyanic acid (HCN). HCN is produced on an industrial scale and is a highly valuable. The purposes of this study are: to determine the economic advantage of sandcrete blocks produced using cassava waste water, compare the compressive strength of sandcrete hollow blocks produced using cassava waste water and distilled water Sandcrete blocks, compare water absorption rate of sandcrete hollow blocks produced using cassava water as an admixture and distilled water Sandcrete blocks and suggest the potential usability of the recycled cassava waste water.

1.3 PROPERTIES OF SANDCRETE BLOCKS

1.3.1 Porosity

Presence of admixtures may increase, decrease or maintain the porosity of the main material depending on the aggregate sizes. When exposed to persistent flooding, a highly porous block could absorb much water, consequently become weakened and eventually fail. The volume of liquid absorbed by a porous medium is an indication of its pore volume and it is a good approximate measure of its porosity. Hence, porosity □ is obtained with the relation.

$$\square = \frac{Vf}{V} \times 100\% \qquad (1)$$

1.3.2 Permeability

The term "permeability" is often loosely used to cover a number of different properties. In this study, it is defined as the property of a porous medium which characterizes the ease with which a fluid will pass through it under atmospheric pressure. Darcy's law for fluid flow in a permeable medium expresses permeability in terms of measurable quantities and states that the steady state rate of flow is directly proportional to the hydraulic gradient H^2

$$K = \frac{\square H^2}{2\,t\,h} \qquad (2)$$

1.3.3 Sorptivity

In using blocks for external walls in tropical humid climate, water resistance ability of the blocks must be considered in order to minimize penetration of moisture or rain water into the interior of the building. Many times, block work is used in the construction of channels for drainage. Blocks used for drainage or similar purpose must have low water absorption value. The absorption of water rate under capillary action is directly proportional t.

$$A'' = S\sqrt{t} \qquad (3)$$

1.3.4 Thermal properties

Thermal properties of most cementitious materials are found to change with the presence of admixtures (Cisse and Laguerbe, 2000; Okpala, 1993). Changes found depend on the admixture's grain structure or interstitial arrangement within the main material and other micro structural parameters including the volumetric fraction of each constituent, the shape of the particles, and the size distribution of the particles. In predicting the thermal performance of buildings, it is necessary to consider the dynamic effects of this variation. The Thermal conductivity measures the quantity of heat that flows through a material per unit time. From the Fourier's steady-state heat conduction equation, thermal conductivity is determined using the equation below.

$$K = \frac{Q}{A}\frac{\Delta x}{\Delta T} \qquad (4)$$

II HYDROCYANIC ACID

Hydrogen cyanide (HCN), sometimes called prussic acid, is an inorganic compound with the chemical formula HCN. It is a colorless, extremely poisonous liquid that boils slightly above room temperature, at 25.6 °C (78.1 °F). HCN is produced on an industrial scale and is a highly valuable precursor to many chemical compounds ranging from polymers to pharmaceuticals. Hydrogen cyanide is a linear molecule, with a triple bond between carbon and nitrogen. A minor tautomer of HCN is HNC, hydrogen isocyanide. Hydrogen cyanide is weakly acidic with a pKa of 9.2. It partially ionizes in water solution to give the cyanide anion, CN–. A solution of hydrogen cyanide in water (HCN), is called **HYDROCYANIC ACID**. The salts of the cyanide anion are known as cyanides.

2.1 Hydrocyanic Acid in Cassava

Cassava is a perishable commodity with a life span less than 3 days after harvest. Processing provides a means of producing shelf stable products (thereby reducing losses), adding value at a local rural level and reducing the bulk to be marketed (Phillips et al., 2005). As urban population expand, the demand for more convenience and shelf-stable foods increases. Some cassava foods, such as Garri, tapioca, and attieke, are highly prized by urban populations, and these have managed to retain their markets. Imported food products are important urban foods but there is still a high demand for traditional foods, although they are often considered less acceptable for some class of people because they are worried about the quality and safety (Sanni et al., 2007). In Africa, cassava is currently utilized for two main purposes: human food and industrial usage. Estimates for the percentage of cassava used for industrial utilization range from 5 to 16% while the rest used directly for human consumption. Most of cassava's industrial utilization is for animal feed. About 10% of its industrial demand consists of high quality cassava flour used in biscuits and other confectioneries, dextrin, pre-gelled starch for adhesives, and starch for pharmaceuticals and seasonings. The cyanogenic glucosides of cassava (Linamarin and Lotaustralin) on hydrolysis releases hydrocyanic acid (HCN). Cassava is often classified as "bitter or sweet" according to the amount of cyanide present. However, several studies have shown that bitterness or sweetness could not be exactly correlated with the level of cyanogenic glucosides.

2.5.2 Fermentation of Cassava

In industry, as well as other areas, the uses of fermentation progressed rapidly after Pasteur's discoveries. Between 1900 and 1930, ethyl alcohol and butyl alcohol were the most important industrial fermentations in the world. But by the 1960s, chemical synthesis of alcohols and other solvents were less expensive and interest in fermentations waned. Cassava being the sole source of hydrogen cyanide which dissolves on solution to produce hydrocyanic acid is fermented .The roots were peeled, washed and immersed in water in a clean plastic container and another was grated and put in a muslin bag and submerged in water in a clean plastic container. The temperature of both containers was maintained constantly at of 30 oC. The fermentation process of the cassava grated cassava tubers was observed. The fresh, peeled tubers were suspended in water and allowed to ferment for 96hours by the natural micro flora. After successful fermentation; the produced cassava water was collected and carried to the department of Civil and Environmental Engineering Concrete Laboratory, the Federal University of Technology, Akure, for the production of sandcrete block.

III Method of Approach and Analysis

3.1: Sandcrete Block Production

In this study two types of sandcrete blocks were produced. The first type is 100% distilled water, cement, and sand. Similarly, the second type is 100% cassava waste water, cement, and sand. These two types of sandcrete blocks were produced to see if there is any difference between the two. Sieve analysis test was also carried out on the soil samples to ascertain their suitability for block making in accordance to BS 1377. All sandcrete blocks produced are hollow blocks made of the same material, same mechanical mixing process and vibrating machine. The standard mix proportion was the same and took place at the same time. The sizes of the block produced are the same (150 x 225 x 450) mm (6inches), the types of hollow sandcrete blocks commonly used for building construction in Nigeria. The slump was rammed into the machine moulds, compacted and smoothed off with a steel face tool. This process was performed for (on) both. After removal from the machine moulds, the blocks were put/ left on pallets under cover in separate rows, one block high and with a space between 2 blocks for the curing period. They are kept wet during this period by watering daily. All tests were carried out on day 7, 14, 21 and 28. On each day three samples from each type were teste. All tests were conducted in accordance with BS 3921, 2028 and NIS 2000, 87: 2000 and 2004 requirements.

3.1.1 Mixing

The mixing was done mechanically so as to get good proportional mix of the constituent materials for the Sandcrete blocks production. All the materials for the Sandcrete block which is cement, fine aggregate, 100% cassava waste water and 100% distilled water, both were measured and ensured they were well mixed before pouring into the mould.

3.1.2 Curing

Proper curing methods were utilized to ensure that the blocks attained self strength as observed for day 7, 14, 21 and 28.

3.2 LABORATORY TESTS

All tests were carried out at the department of Civil and Environmental Engineering Concrete Laboratory the Federal University of Technology, Akure, (FUTA) Ondo State.

IV ANALYSIS OF RESULTS

4.1. Specific gravity test

The application of specific gravity was employed; the values obtained the tests are used in the calculation below to determine the specific gravity of fine-grained soil. This result obtained from the calculation is within block range or limit of NIS and BS.

Specific gravity of soil particles $Gs_1 = \frac{M2-M1}{(M4-M1)-(M3-M2)}$	$\frac{409-269}{(579-269)-(664-409)} = \frac{140}{55} = 2.55$

4.2 Sieve Analysis results

4.2.1 Sieve Analysis

The sieve Analysis tests were carried out on sand samples so as to ascertain its particle size distribution. The result of sieve analysis is shown in the figure 4.1 below. The result shows fine grain sand with more than 90 percent passed through. It shows that the soil is well graded indicates that the sand is good for the of sandcrete blocks (Cc=15mm).

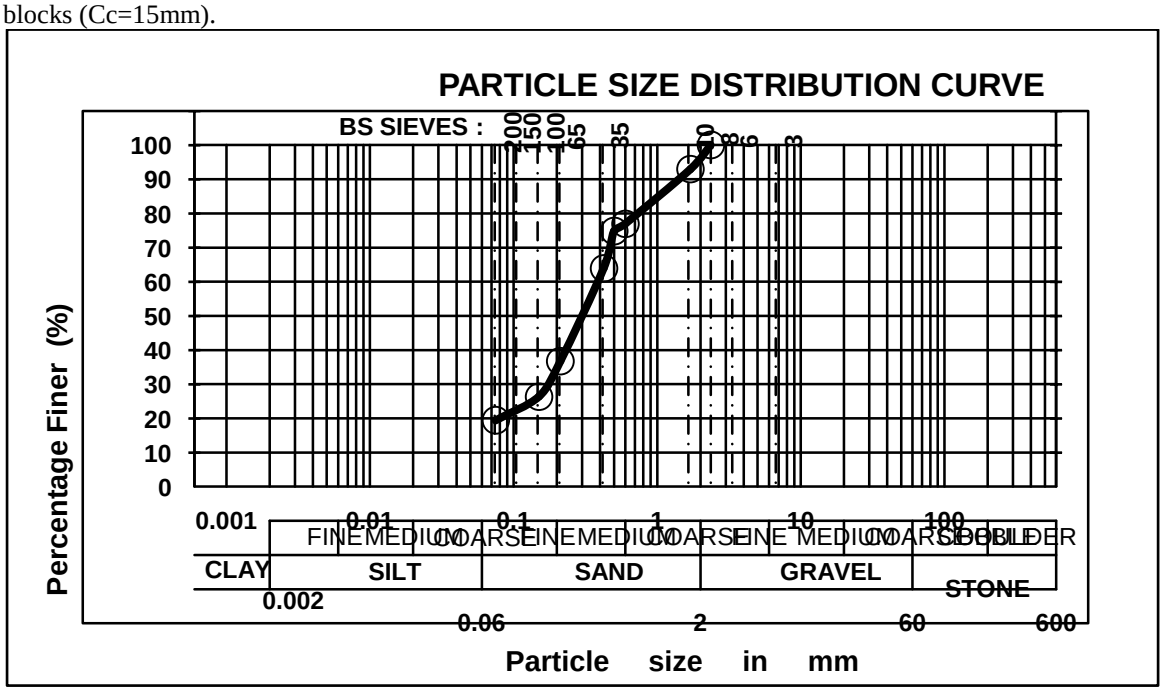

Figure 4.1 Particle size distribution (PSD) of Sample used

4.2.1 Silt/Clay test

Silt clay content test result obtained was 9.33% . the result is within the silt clay context limit.

4.2.2 Moisture Content

The tests result obtained from the average moisture content was 8.19% which is below NIS maximum requirement 12%.

4.2.3 Water Absorption Rate

Figure 4.2 below shows the results of water absorption rate obtained from the tests conducted on distilled water and cassava waste water sandcrete blocks. As can be seen from the figure the absorption rate varies from day 7 to day 28. At day 7, the water absorption rate varies from 1.8% cassava sandcrete block samples to 3.2% distilled sandcrete block samples. Similarly, At day 14 the water absorption rate varies from 2% to 4.0%. Likewise, at day 21, it varies from 2.4% to 4.5% and at day 28 the water absorption rate varies from 3.8% to 5%. As be seen from the figures below the absorption rate fall below NIS and BS maximum recommendation 12% However using Cassava waste waster as admixture water absorption is very low. It means that cassava sandcrete block samples retain water water than normal sandcrete block samples. The water present in mortar would be ratained longer in cassava samples than the normal samples. Cracks may not appear for number of years due to lower water absorption rate.

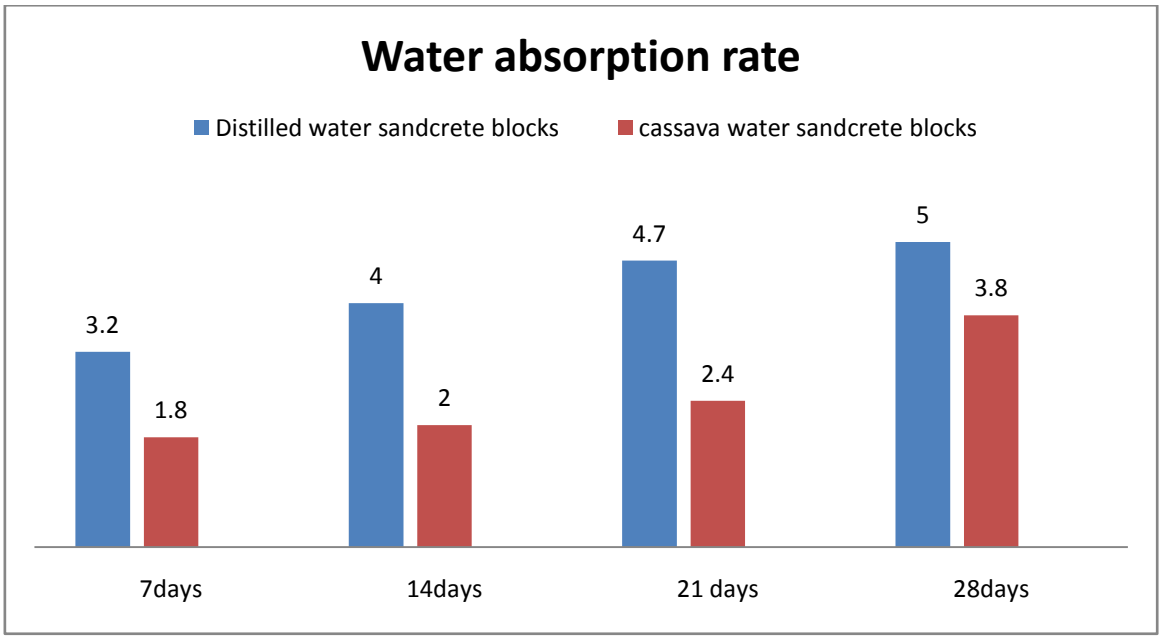

Fig 4.2b: Showing the rate of water absorption of Sandcrete block.

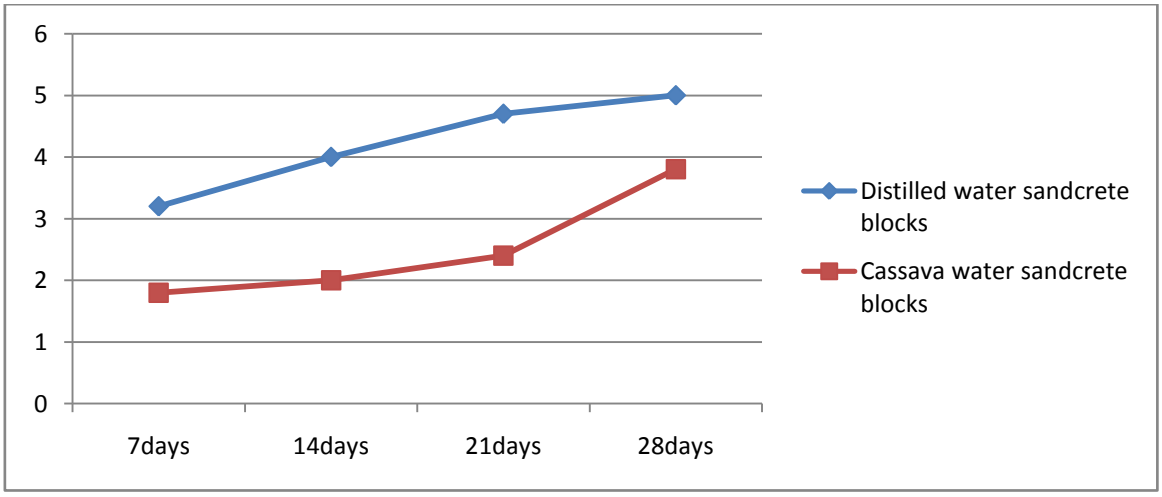

Fig 4.2b: Water absorption rate against the block Age

4.3 COMPRESSIVE STRENGTH TEST

The compressive strength of the samples obtained is shown in the figures 4.3a and 4.3b below, day 7, day 14, day 21, and day 28. Test results indicate that the unit compressive strength for Normal Sandcrete Block samples fall below the recommendation line of NIS and BS for day (7, 14, 21 and 28), while Cassava waste water sandcrete block samples attained higher than the maximum NIS and BS recommendation. The Compressive Strength values are indicated in the figures 4.3a and 4.3b. As can be seen in the figures 4.3a and 4.3b, the values obtained from Normal or distilled sandcrete blocks (0,61, 0.76, 0.99, 1.03) N/mm^2 fall below the NIS and BS requirements. Whereas cassava waste water admixture attained day 7, 14, 21, and 28 attained values as shown bracket (1.11, 3.03, 3.22 and 4.06) N/mm^2 satisfy the NIS and BS requirements. In comparison according to Figures 4.3a to 4.3b and 4.2a, 4.2b the results showed that cassava waste water sandcrete blocks attained higher compressive strength and absorbed or retained less water than distilled or normal sandcrete blocks. It shows that cassava sandcrete block may resist cracking for number of years if used for building construction.

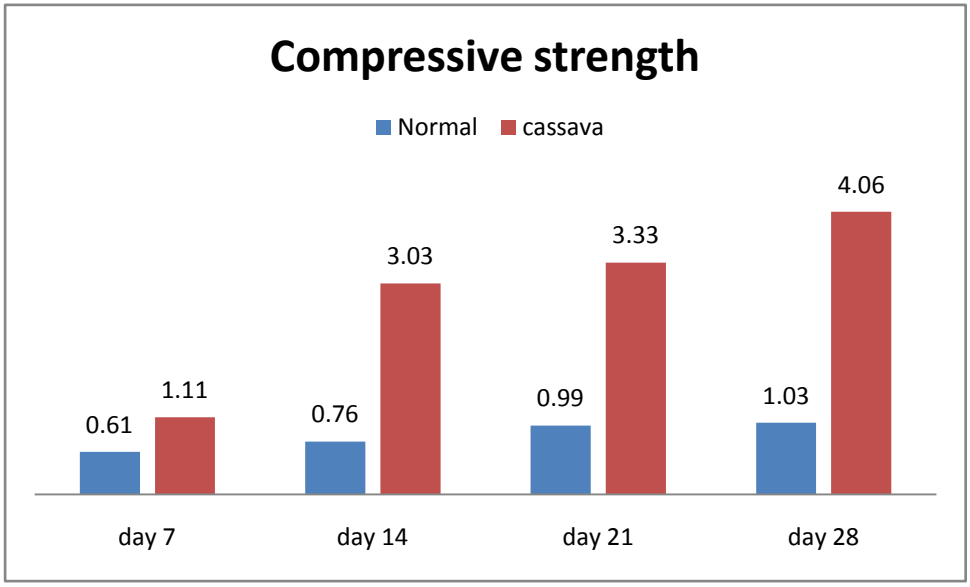

Figure 4.3a Compressive strength captured at day 7,14, 21 and 28

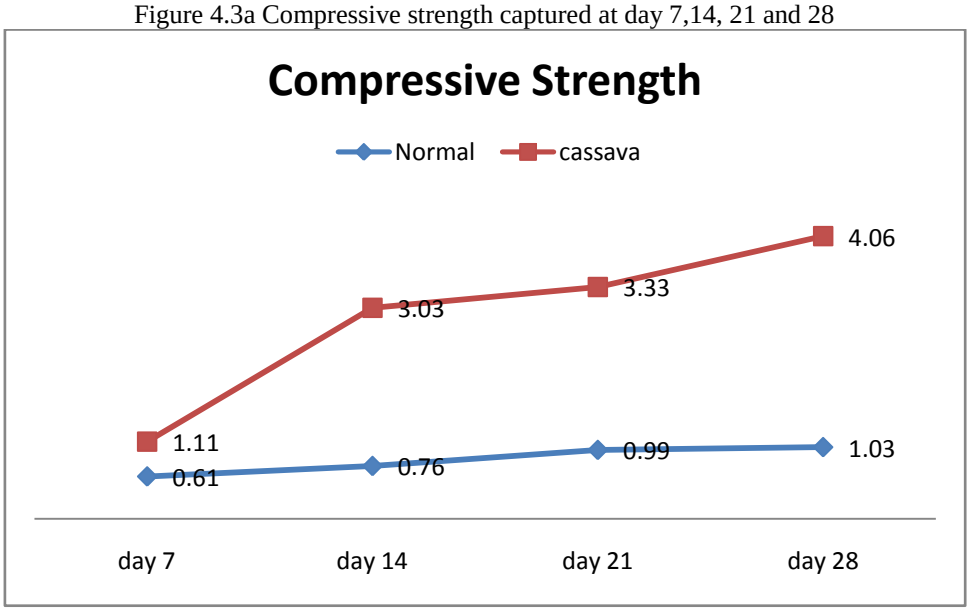

Figure 4.3b Compressive strength captured at day 7,14, 21 and 28

V CONCLUSIONS AND RECOMMENDATIONS

The cassava waste water sandcrete blocks at the age of day 14 and 21 have successfully satisfied the Nigerian Industrial Standard which specifies that the lowest compressive strength of individual blocks should not be less than 2.5 N/mm$^{2.}$ At the same time at day 28 the cassava waste water sandcrete blocks attained higher compressive strength (4.06) N/mm^2 above NIS and BS recommendations 3.5N/mm^2 and absorb less water

(3.8%). The result obtained on the distilled water Sandcrete blocks shows a compressive strength at day 28(1.03) N/mm^2 below the NIS requirement and also absorb more water than Cassava blocks. All tests results conducted showed that the sandy soil components mixed with cement, water and admixture with Cassava waste water is suitable for the production of the sandcrete blocks and also good for construction of a building according to NIS 87: 2004 and NIBBR 2006. The study suggests that sandcrete blocks be used for building construction or for any structure. Cassava waste water serves as a repellant to water absorption of Sandcrete blocks and also displays a whitish aesthetic nature.

5.2 RECOMMENDATIONS

Majority of sandcrete blocks commercially produced in Nigeria have failed to meet the requirement standard set down by NIS, NIBBRI and BS. This suggests that there is a need for improvement in this area. More research, more studies are required to develop new alternative sustainable local product to replace old product at lower costs. There is a need for good Government policies to support and encourage effective education and research on waste management, safe disposal and recycling.

From the analysis of Cassava waste water sandcrete block samples suggest that the cassava waste water be used as an admixture in sandcrete hollow block production. It is easily assessable, cheap and highly functional.

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Summarization of Malayalam Document Using Relevance of Sentences

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Abstract—Text summarization is an emerging technique for finding out the summary of the text document. Text summarization is nothing but summarizing the content of given text document. Text summarization has got so uses such as Due to the massive amount of information getting increased on internet; it is difficult for the user to go through all the information available on web. Summarization techniques need to be used to reduce the users time in reading the whole information available on web. In this paper propose a Malayalam text summarization system which is based on MMR technique with successive threshold. Here the sentences are selected based on the concept of maximal marginal relevance. The key idea is to use a unit step function at each step to decide the maximum marginal relevance and the number of sentences present in the summary would be equal to the number of paragraphs or the average number of sentences present in the text document, which can be achieved by using successive threshold approach. We apply MMR approach on Malayalam text summarization task and achieve comparable results to the state of the art.

Keywords- Maximum Marginal Relevance, Successive Threshold, Unit step function.

I. INTRODUCTION

Text summarization has become an important and timely tool for assisting and interpreting text information in todays fast-growing information age. It is very difficult for human beings to manually summarize large documents of text. There is an abundance of text material available on the internet. However, usually the Internet provides more information than is needed. Therefore, a twofold problem is encountered: searching for relevant documents through an overwhelming number of documents available, and absorbing a large quantity of relevant information. The goal of automatic text summarization is condensing the source text into a shorter version preserving its information content and overall meaning.

A summary can be employed in an indicative way as a pointer to some parts of the original document, or in an informative way to cover all relevant information of the text. In both cases the most important advantage of using a summary is its reduced reading time.

A good summary system should reflect the diverse topics of the document while keeping redundancy to a minimum. Summarization tools may also search for headings and other markers of subtopics in order to identify the key points of a document. Microsoft Words AutoSummarize function is a simple example of text summarization.

Text Summarization methods can be classified into extractive and abstractive summarization. An extractive summarization method consists of selecting important sentences, paragraphs etc. from the original document and concatenating them into shorter form. The importance of sentences is decided based on statistical and linguistic features of sentences.

An Abstractive summarization attempts to develop an understanding of the main concepts in a document and then express those concepts in clear natural language. It uses linguistic methods to examine and interpret the text and then to find the new concepts and expressions to best describe it by generating a new shorter text that conveys the most important information from the original text document.

This paper focuses on extractive text summarization of Malayalam documents. Even though a lot of text summarization systems have been developed for summarizing documents in various languages, there is no such well performing system for Malayalam. The existing systems having high computational cost and time and

also the storage capacity.To address the issues of computational cost time and storage capacity, here proposes a text summarization system that works on the concept of maximal marginal relevance between the sentences or the words. The key idea is to use a unit step function at each step to decide the maximum marginal relevance and the number of sentences present in the summary would be equal to the number of paragraphs or the average number of sentences present in the input text document, which can be achieved by using successive threshold approach.

Malayalam is the official language of Kerala and there are around 33 million people who speak Malayalam. There is a vast amount of online data available in Malayalam and more than 30,000 articles are available in Malayalam Wikipedia. This warrants us to develop tools that can be used to explore digital information presented in Malayalam and other native languages. In this paper, we propose the MMR based Malayalam Text Summarization with Successive Thresholds.

Malayalam Text Summarization with Successive Thresholds. This paper is organized in five sections.Section II reviews the related works. Section III describes proposed scheme. In section IV,we highlight the evaluation of the proposed scheme. Conclusion and future work is described in section V.

II. RELATED WORK

Attempts to automatically summarize documents started early since 1958. The method based on word frequencies by Luhn is one of the oldest but still relevant method. This method measures the importance of a sentence based on the presence of keywords (most frequently occurring words in a document otherthan the stopwords) in the sentence. Text summarization method by Ed-mundson used cue words, title words, and sentence location for determining the sentence weights [4]. Text summarization for Malayalam documents by Rajina Kabeer and Sumam Mary Idicula [1].

Graph theoretical approaches to summarization represents a document as an undirected graph, in which the nodes represent the sentences in the document. Two nodes in the graph are are connected if the cosine similarity of the sentences corresponding to the nodes is above some particular threshold. The sentences corresponding to the nodes with the highest cardinality or in other words the sentences which are more similar to other sentences in the document are considered important and are included in the summary [8]. Methods based on Co-reference chains and Lexical chains are based on the semantic structure of the document.

Semantic graph based approaches extracts semantic triplets (Subject-Object-Predicate triplets) from each of the sentence in the document. These triplets are used to generate a semantic graph of the document. A sub-graph of the semantic graph is selected using machine learning techniques and the sentences corresponding to the sub-graph are extracted into the summary [2].

the summarization process as a classification problem Le. To classify the sentences in a document as summary sentences and non-summary sentences based on the features that they possess [4]. Nave Bayes method, Neural networks and Hidden Markov Model (HMM) are some of the machine learning approaches used for text summarization.

Information extraction by abstractive text summarization for Telugu language by Jagadish S Kallimani, Srinivasa KG and EswaraReddy B [7], Tamil document summarization using semantic graph method by Banu M, Karthika C, Sudarmani P and Geetha T.V [14], Text extraction for an Agglutinative Language by Sankar K, VijaySundar Ram R and Sobha Lalitha Devi which was used for summarizing Tamil documents [8], Keyword extraction based summarization of categorized Kannada text documents by Jayashree.R, Srikanta Murthy.K and Sunny.K [12] and Bengalitext summarization by sentence extraction by Kamal Sarkar [6] are some text summarization works done for Indian languages.

III. PROPOSED SCHEME

In the proposed method, a single-document input is summarized based on the concept of maximal marginal relevance between the sentences or the words. The key idea is to use a unit step function at each step to decide the maximum marginal relevance and each word meaning is calculated with the help of a dictionary, finally the number of sentences present in the summary would be equal to the number of paragraphs or the average number of sentences present in the input text document, which can be achieved by using successive threshold approach.

A. Maximal Marginal Relevance

The key idea in this technique is to use a unit step function at each step to decide the maximum marginal relevance. The automatic summarization process may contain following steps.

1.Input a document to be summarized.
2.Now the document is traversed and eliminates the words that are not useful (stop word removal).
3.Starting with the starting position of the sentence until the document finishes.
4.Identify the most important word/sentence (by meaning) with the help of a Malayalam dictionary.
5.Using the unit step function we can calculate the relevant information required.

The unit step function used in the algorithm is given as uk+1=arg max (sim1(ui,Q)-max(sim2(ui,uj)))
Where
Q: the user input document
ui: the most important word/sentence
uj: the remaining sentences in the document
U: the selected list of sentences.
6. The process may be terminated once an appropriate number of words or sentences is in U. Which can be achieved by using successive threshold approach.

B. Successive Threshold Approach

The concept behind this approach is that the number of sentences present in the summary would be equal to the number of paragraphs or the average number of sentences present in the input text document. That is initially count the total number of paragraphs and sentences in the given text document, if the total number of paragraphs in the input text document is meet a threshold value then take the value of n as number of paragraphs otherwise take n as average number of sentences in the input document. After applying all the preprocessing steps and the MMR technique to select the relevant information or the sentences from the document. Then count the total number of sentences say it is m, if m is equal to n, then these are the sentences finally included in the summary. Else, repeat the steps of MMR technique until the m value will be equal to n.
As an example consider the following input text shown in figure 1 and the corresponding output obtained for the text using proposed method is shown in figure 2.

കൊല്ലം: ജനസമ്പർക്ക പരിപാടിക്കെതിരായ വിമർശനങ്ങൾ കേട്ട് ഇതിൽ നിന്ന് പിന്മാറില്ലെന്ന് മുഖ്യമന്ത്രി ഉമ്മൻ ചാണ്ടി. സാധാരണക്കാരുടെ പ്രശ്നങ്ങൾ പരിഹരിക്കാനുള്ള ശ്രമമാണ് നടത്തുന്നത്. വളരെ ന്യായമായ കാര്യങ്ങളിൽ വേഗത്തിൽ തീരുമാനങ്ങൾ എടുക്കാൻ കഴിയുന്നതാണ്. എന്തൊക്കെ വിമർശനം ഉണ്ടായാലും ജനങ്ങൾക്ക് വേണ്ടി ജനപക്ഷത്ത് നിന്ന് അവരുടെ പ്രശ്നങ്ങൾ പരിഹരിക്കും. കൊല്ലത്ത് ജനസമ്പർക്ക പരിപാടി ഉദ്ഘാടനം ചെയ്ത് സംസാരിക്കുമ്പോഴാണ് അദ്ദേഹം ഇക്കാര്യങ്ങൾ പറഞ്ഞത്. ശാസ്താംകോട്ട കായലിന്റെ സംരക്ഷണത്തിന് ആദ്യം ചെയ്യേണ്ടത് ജില്ലയിലേക്ക് വെള്ളം കൊടുക്കാൻ മറ്റൊരു ശ്രോതസ് കണ്ടെത്തി അത് സജ്ജമാക്കുകയാണ്. കല്ലടയാറിൽ, കടപുഴയിൽ ബണ്ട് കെട്ടി, അവിടുത്തെ വെള്ളം ജില്ലയിലേക്ക് വിതരണം ചെയ്യാൻ 19 കോടി രൂപയുടെ പദ്ധതി തയ്യാറാക്കി ധനകാര്യ വകുപ്പിലേക്ക് അനുമതിക്കു അയച്ചിട്ടുണ്ടെന്നും അദ്ദേഹം അറിയിച്ചു. ആലപ്പാട് പാക്കേജിൽ പെടുത്തി സുനാമി ദുരിതാശ്വാസ പ്രവർത്തനങ്ങളുടെ ഭാഗമായി നിർമ്മിച്ച വീടുകളുടെ അറ്റകുറ്റ പണികൾക്കും, കുടിവെള്ളം, സ്വീവേജ് തുടങ്ങിയ സൗകര്യങ്ങൾക്കും വേണ്ടി 10 കോടി രൂപ അനുവദിച്ചു. കൊല്ലം കരുനാഗപ്പള്ളി ഭാഗത്ത് 2000 കുടംബങ്ങൾക്ക് വേണ്ടി നിർമ്മിച്ച ഫ്ലാറ്റുകളിലെ സ്വീവേജ് സൗകര്യം ഒരുക്കുവാനുള്ള 7 കോടി രൂപയുടെ പദ്ധതി തയ്യാറാക്കിയത് മാസങ്ങൾക്കുള്ളിൽ നടപ്പിലാക്കും. ഇവിടത്തെ കടൽ തീരം സംരക്ഷിക്കുന്നതിനു വേണ്ടിയുള്ള 11 കോടി രൂപയുടെ പദ്ധതി പൊതു മേഖല സ്ഥാപനങ്ങളായ കഞ്ഞിഘ, ഗങ്ങഘ ചേർന്ന് വഹിക്കും.

അഷ്ടമുടി കായലും, തങ്കശ്ശേരി കടലോരവും, തെന്മലയും ചേർത്ത് ഒരു ടൂറിസം സർക്യൂട്ട് രൂപീകരിക്കും. ഇവിടെ 5 കോടി രൂപ ചെലവു വരുന്ന ഒരു വാട്ടർ സ്പോർട്ട് പദ്ധതിയും തുടങ്ങും. കൊല്ലത്തിന്റെ വളരെ കാലമായുള്ള ആവശ്യമാണ് ഒരു കോടതി സമുച്ചയം. അതിന് പണം അനുവദിച്ചു. എവിടെ സ്ഥാപിക്കണം എന്ന കാര്യത്തിൽ മാത്രമാണ് ഇനി തീരുമാനം ആവാനുള്ളത്. കൊല്ലത്തിന്റെ ചുമതലയുള്ള മന്ത്രി ഷിബു ബേബി ജോൺ കളക്ടറുമായി കൂടിയാലോചിച്ച് ഒരു മാസത്തിനകം തീരുമാനം എടുക്കും. കൊട്ടാരക്കരയിൽ കേന്ദ്രീയ വിദ്യാലയം സ്ഥാപിക്കുവാനായി 5 ഏക്കർ ഭൂമി അനുവദിക്കുമെന്നും അദ്ദേഹം പറഞ്ഞു. ഈ ഘട്ടത്തിലെ അഞ്ചാമത്തെ ജനസമ്പർക്ക പരിപാടിയാണ് കൊല്ലത്ത് നടക്കുന്നത്. ഇതു വരെയുള്ള ജില്ലകളിൽ നിന്നുയർന്നു വന്ന ഒരു പ്രശ്നം ഹിമോഫീലിയ രോഗികൾക്ക് കാരുണ്യ ഫണ്ടിൽ നിന്നും അനുവദിച്ചിട്ടുള്ള രണ്ടു ലക്ഷം രൂപ മതിയാകുന്നില്ല എന്നാണ്. ഹിമോഫീലിയ രോഗികൾക്ക് ആജീവനാന്തം മരുന്ന് കഴിക്കേണ്ടതാണ്, അവരുടെ ആവശ്യം തികച്ചും ന്യായമാണ്. ഈ പരിപാടിക്കിടയിൽ തന്നെ ഹിമോഫീലിയ രോഗികൾക്ക് അനുവദിക്കേണ്ട തുകയുടെ പരിധി ഉയർത്താൻ വേണ്ടി നിയമ ഭേദഗതി വരുത്തി, അവർക്കുള്ള മരുന്നുകൾ ആജീവനാന്തം സൗജന്യമായി കൊടുക്കുവാനുള്ള തീരുമാനം എടുത്തിട്ടുണ്ടെന്നും മുഖ്യമന്ത്രി പറഞ്ഞു

Figure 1. Input Text Document

കല്ലടയാറിൽ, കടപുഴയിൽ ബണ്ട് കെട്ടി, അവിടുത്തെ വെള്ളം ജില്ലയിലേക്ക് വിതരണം ചെയ്യാൻ 19 കോടി രൂപയുടെ പദ്ധതി തയ്യാറാക്കി ധനകാര്യ വകുപ്പിലേക്ക് അനുമതിക്കു അയച്ചിട്ടുണ്ടെന്നും അദ്ദേഹം അറിയിച്ചു. കൊല്ലം കരുനാഗപ്പള്ളി ഭാഗത്ത് 2000 കുടുംബങ്ങൾക്ക് വേണ്ടി നിർമ്മിച്ച ഫ്ലാറ്റുകളിലെ സ്വീവേജ് സൗകര്യം ഒരുക്കുവാനുള്ള 7 കോടി രൂപയുടെ പദ്ധതി തയ്യാറാക്കിയത് മാസങ്ങൾക്കുള്ളിൽ നടപ്പിലാക്കും. ഇവിടത്തെ കടൽ തീരം സംരക്ഷിക്കുന്നതിനു വേണ്ടിയുള്ള 11 കോടി രൂപയുടെ പദ്ധതി പൊതു മേഖല സ്ഥാപനങ്ങളായ കഞ്ഞേഘ, ഗങ്ങഘ ചേർന്ന് വഹിക്കും. ആലപ്പാട് പാക്കേജിൽ പെടുത്തി സുനാമി ദുരിതാശ്വാസ പ്രവർത്തനങ്ങളുടെ ഭാഗമായി നിർമ്മിച്ച വീടുകളുടെ അറ്റകുറ്റ പണികൾക്കും, കുടിവെള്ളം, സ്വീവേജ് തുടങ്ങിയ സൗകര്യങ്ങൾക്കും വേണ്ടി 10 കോടി രൂപ അനുവദിച്ചു.

Figure 2. Output Summary

IV. EVALUATION

As shown in the below table is the different parameter evaluation of the existing method. The method is implemented on 6 different dataset of different sizes and various parameters such as precision, recall and F-measure is calculated.

Table I
PARAMETER EVALUATION EXISTING METHOD

Dataset	Precision	Recall	F- measure
Dataset1	0.485	0.525	0.530
Dataset2	0.5309	0.5765	0.5665
Dataset3	0.5807	0.6635	0.5978
Dataset4	0.6679	0.7814	0.7449
Dataset5	0.656	0.7756	0.7645
Dataset6	0.772	0.7901	0.7801

Table II shows parameter evaluation of the Proposed method. The method is implemented on 6 different dataset of different sizes and various parameters such as precision, recall and F-measure is calculated.

Table II
PARAMETER EVALUATION PROPOSED METHOD

Dataset	Precision	Recall	F- measure
Dataset1	0.535	0.565	0.543
Dataset2	0.5407	0.5805	0.5785
Dataset3	0.5917	0.6743	0.6537
Dataset4	0.6779	0.7896	0.7549
Dataset5	0.673	0.7826	0.7775
Dataset6	0.852	0.8910	0.8018

V. CONCLUSION AND FUTURE WORK

The text summarization provides the summary of the text document. Here an efficient technique of text summarization is proposed. The proposed method is works on the concept of maximal marginal relevance between the sentences or the words. The key idea is to use a unit step function at each step to decide the maximum marginal relevance, and the number of sentences present in the summary would be equal to the number of paragraphs or the average number of sentences in the input text document, which can be achieved by using successive threshold approach. Analysis shows that proposed method is more accurate. More quality parameters are generated by incorporate another methods is future work.

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Assessment of Heavy Metals in Water Samples of Cauvery River and Kallanai Kalvaai around Kallanai Dam in Tamil Nadu

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ABSTRACT : Heavy metals usually present in trace amounts in natural water. Some metals are essential to human and animals but they are toxic when their limit exceeds. Their concentration increase in water due to addition of industrial wastes, sewages and domestic wastes, Iron concentrations in the sewages are very low than the permissible limit which was analysed here. Water quality of Cauvery River and Kallanai Kalvaai analysis helped to get the information's of chemical, physical, biological, and radiological characteristics of water. Water quality of these river and dam are used to measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose.
KEYWORDS– Cauvery river, Heavy metals, Kallanai Kalvaai

I. INTRODUCTION

Heavy metals are environmentally stable and non-biodegradable, toxic to the living beings and tend to accumulate in plants and animals causing chronic adverse effects on human health. Heavy metals are introduced to the environment through a variety of sources such as combustion, extraction, agricultural runoff, transportation etc. Heavy metals are toxic pollutants that severely reduces the use of water for domestic and industrial application. Frequent use of heavy metal contaminated water in the agricultural fields leads to soil pollution and gradually enriched the soil with heavy metals. Different studies have revealed that the presence of toxic heavy metals like Fe, Pb, Hg reduce soil fertility and agricultural Though some of the metals like Cu, Fe, Mn, Ni and Zn are essential as micro nutrients for plants and microorganisms, many other metals like Cd, Cr and Pb are proved detrimental beyond a certain limit. The surface water infiltration, soil contaminants such asheavy metals can leach to underlying groundwater [1-3]. Occurrence of heavy metals in ground water are directly related to soil characteristics that determine the rate of water movement. Samples have been selected from surface of river and ground in and around areas of Kallanai Dam at two different season.

Aggarwal, T.R., Singh, K.N. and Gupta reported that the detection of lake water quality could be linked to nutrient loading from domestic sewage [4]. The raw sewage is the source of phosphorous and nitrates of water. Heavy metals are those having a density more than five times that of water. They are usually present in trace amounts in natural water but many of them are toxic even at very low concentrations. Their concentrations increase in water due to addition of industrial wastes and sewage. Some of them get biomagnified in water and get accumulated in higher topic levels e.g., fish, crabs and other aquatic organisms. Some of heavy metals are extremely essential to human, like Cobalt, Copper and Molybdenum but large quantities of them may cause physiological disorders, many of them quite serious. Metals such as Arsenic, Lead, Cadmium, Mercury and Selenium are highly toxic even in minor amounts [5-7].

II. HEAVY METAL ANALYSIS

The heavy metal analysis of water samples have been determined by Atomic Absorption Spectroscopy. The elements arsenic, cadmium, copper, iron, lead, manganese, molybdenum, vanadium and zinc have been analysed. Flame spectroscopy is an analytical technique used for the qualitative and quantitative determination of the element in a sample. In this method , samples are introduced in the form of a homogenous liquid, into a flame where thermal and chemical reactions create 'free' atoms capable of absorbing, emitting or fluorescing at a characteristic wavelength.

In atomic absorption spectroscopy majority of free atoms in the commonly used flames are in the ground state. A light source emitting a narrow spectral line of the characteristic frequency is used to excite the free atoms in to the flame. The decrease in energy of the light is then measured. The absorbance is proportional to the concentration of free atoms in the flame, given by Lambert-Beer's Law[8].

$$\text{Absorbance} = \log (I_o / I_t) = k\, C\, l$$

Where, I_o = Intensity of incident radiation emitted by the light source

I_t = Intensity of transmitted radiation (amount not absorbed)

C= Concentration of sample (free atoms)

k= Constant (molar extinction coefficient) can be determined experimentally
l = Path length.

This is the most common method where interference effects are known to be absent. Usually at least three standards and a blank are used to cover the range of 0.1 to 0.8 absorbance. The blank solution is used to calibrate the instrument. The standards are then analysed with the lowest concentration first, and the blank run between standards, to ensure that the baseline (zero point) has not changed [9-11]. Samples are then analysed and their absorbance recorded. A graph of absorbance versus concentration is plotted. The calibration can be performed in the concentration mode in which case the concentration of the sample is read off directly. In atomic absorption spectroscopy the wavelength(nm) and flame type for different heavy metals are listed in Table 1.

III. SAMPLE COLLECTION

The heavy metals analysis was performed for Kallanai Dam river samples (mainly from Cauvery river and Kallanai Kalvaai) collected from six stations A1 to A3 and B4 to B6 ((from Cauvery river and Kallanai Kalvaai). Water samples were examined to detect and to estimate the concentration of heavy metals. Water samples were collected twice in a year from April 2013 to October 2014.

(Note: Arsenic is converted to its hydride and aspirated into argon-hydrogen flame.)

IV. FIGURES AND TABLES

Table -1 The wavelength(nm) and flame type for different heavy metals

Element	Wavelength (nm)	Type of Flame
Iron (Fe)	**248.3**	**Air acetylene**
Lead (Pb)	**283.3**	**Air acetylene**
Zinc (Zn)	**213.9**	**Air acetylene**
Manganese(Mn)	**279.5**	**Air acetylene**
Copper (Cu)	**324.7**	**Air acetylene**
Cadmium (Cd)	**228.8**	**Air acetylene**
Arsenic (As)	**193.7**	**Argon-Hydrogen**
Vanadium (V)	**318.4**	**Nitrous Oxide Acetylene**

Month & Year	**A1**	**A2**	**A3**	**B1**	**B2**	**B3**
April 2013	0.022	0.224	0.162	0.270	0.044	0.052
October 2013	0.037	0.183	0.064	0.172	0.032	0.023
April 2014	0.031	0.258	0.021	0.210	0.021	0.028
October 2014	0.045	0.211	0.043	0.250	0.031	0.017
Range	0.045-0.022	0.258-0.211	0.187-0.021	0.250-0.172	0.044-0.021	0.052-0.017

Table 2 Iron (Fe) in mg/L of Cauvrey river and Kallanai Kalvaai stretch

To ensure a high-quality product, diagrams and lettering **MUST** be either computer-drafted or drawn using India ink. The high value of iron 0.258 mg/L is observed at A2 in April 2014 and the low value is 0.017 mg/L at A3 in October 2014 [12]. The maximum permissible limit is 0.3 mg/L. It is observed that the values are slightly higher than in summer. The high value in summer may be due to the industrial waste water exposed to the water system and high concentration of industrial effluent and domestic sewages. The concentration of metals in the surface of a river may increase according to the effluent discharged from nearby industries.

V. CONCLUSION

The water quality of Cauvery River and Kallanai Kalvaai, Thanjavur District, Tamil Nadu t is observed that the heavy metal values in summer are high. It may due to the low flow rate of water and high concentration of industrial effluent and domestic sewages. The purpose of the study of Kallanai dam was to divert the waters of the Kaveri across the fertile Thanjavur delta region for irrigation via canals.

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VISCOELASTIC PROPERTIES AND RHEOLOGICAL CHARACTERIZATION OF CARBOMERS

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Abstract: This research wasconducted to determine the effect of viscoelastic properties and Rheological characterization of carbomers. Carbomers are the generic name for a class of high molecular weight cross linked polymer of acrylic acid. Carbomers play an important role in many commercial products such as gels, creams and lotions, providing viscosity, stabilization and suspension properties. Understanding how the preparation of the carbomers can affect the final. One such factor that can affect the behavior of the carbomers is the method of dispersing the carbomers into an aqueous medium, the carbomers considered in this research were from USP grade of materials, from this investigation conducted, it was found a number of carbomers were affected by shear as a result of the method of dispersion used. Use of the shear sensitive carbomers in commercial production could require the use of low shear mixing which would result in a longer dispersion time and increased production cost.

Keywords:DV-II +Pro Viscometer, Rheometer, Shear rate, Shear stress, Viscoelasticity, Carbomers, Emulsion, Amplitude sweep, Flow curve, Oscillation.

Introduction:

Many researchers and investigators have reported the effectiveness of delivering various drugs through the skin via using emulsion preparations with nano-metric droplets size (usually in the range of 20-200 nm). They have proven that such dosage forms possess influential solubilization capability, thermodynamic stability, controllable droplet size, enhanced permeability, *etc* (1, 2, 3,&4).The research was conducted 0.5% dispersion of carbomer neutralized with 18 % Sodium hydroxide at pH-7.3 substances were prepared and subjected for viscosity and Rheological characterization carbomer, the five different grade carbomers are subjected for freezer and Acceralated study at different stages for investigation of rich sensory, high clarity to use, and it is better application of cosmetic facial lotions and gels, body lotions, creams and sunscreen products, by using Viscometer and Rheometer.

Usually, micro-emulsions and sometimes nano-scaled emulsions show poor rheological properties with a very low viscosity making them behave as Newtonian fluids or semisolids of high fluidity. These properties render them pharmaceutically inapplicable and commercially unacceptable as topical products (5). In such circumstances, the addition of thickening agents or gel-network forming substances becomes highly recommended to overcome these minor drawbacks (6).

Materials, like: Carbomers(poly-acrylic acid polymer), gums (polysaccharides), semi-synthetic cellulosic derivatives, *etc*, are widely used pharmaceutically and cosmetically to achieve various purposes, such as: emulsification, stabilization and rheological control (7).

Recently, Carbomer resins have been considered extensively by many researchers and scientists, since they provide a wide range of applications as thickening agents, emulsifying agents, suspending agents and tablets compressed matrix forming agents, which is particularly used in controlling drug release (8).

In general, Carbomer polymers are polymers of acrylic acid, cross-linked with polyalkenyl ethers or divinyl glycol. They are hydrophilic, tightly coiled, mildly acidic (pka 6.0 ± 0.5) fluffy, white and dry flocculated powders with particles having a size of about 0.2 μm in diameter (9). Their neutralized aqueous dispersions demonstrate a high viscosity, which makes them fairly popular for controlling the flow properties of topically applied dosage forms as they are inexpensive, transparent and harmless and easy to prepare and clean (10).

Carbomer polymers are commonly synthesized by crosslinking process with the specific substrate. The degree of cross-linking and the manufacturing conditions usually produce various grades of Carbomers. Each grade demonstrates different criteria that fit it into a specific application (11). Structurally, each discrete unit of this polymer appears as a network of polymer chain interrelated by cross-links. Removing these cross-linkages would render the primary particles to appear as an intertwined but not chemically bonded collection of linear

polymer chains. Such linear polymers are soluble in water and polar solvents, like Carbomer907. On the other hand, all other types of Carbomersare cross-linked. Because of their hydrophilicity and high water sorption ability, they can distend in water up to 1000 times their original volume and 10 times their original diameter forming a gel upon exposure to a pHenvironment above a range of 4 to 6. Once these Carbomermolecules are dispersed in water, they start hydrating and uncoiling to a certain extent. Neutralization of the polymer carboxylate groups using an alkaline substance makes them highly ionized to form rigid gels (12, 13, 14 & 15). This neutralization step is considered as the most common way to can be accomplished by adding a common base, like sodium hydroxide or organic amines, such as triethanolamine, which cause the carboxylate groups of these polymers to be converted into a ionization of these carboxylate groups on the polymer backbone, electrostatic repulsion amongst the negatively charged particles is observed which finally adds to the swelling and thickening capabilities of these polymers (15). In addition, determine the pH range that renders Carbomerpolymers to be powerful thickening and gelling agents. It was found that a pH range of 5 to 9 usually leads to the formation of highly viscoussystems. However, pH values less than 5 and above 9 can be also used, but higher levels of Carbomer must be employed to produce higher viscosity levels (15).

Specifically, Carbomer 934, 940 and Ultrez 10 were reported by many to be of great applications Pharmaceuticallyand cosmetically (6, 7, 13, 14&16). They demonstrate differentrheological properties and viscosity values, which aremainly reflected by the polymer particle size, molecularweight between cross-links, allocation of molecular crosslinksand the fraction of the overall units that arises asterminal units, i.e. free chain ends (12). Recently, CarbomerUltrez 10 was introduced as a hybrid between Carbomer940 and 934. It shows superior dispersion properties andpotentially wider range of applications. These propertiesmake the process of producing homogenous colloidal dispersion of Carbomer Ultrez 10 easier, shorter and cheaper. In other words, less effort and energy are required to produce a lump-free dispersion (14 &17).

Therefore, the current work is aimed to modify the poor flow properties of this formula and assess the gel-network forming properties of two different types of Carbomerresins. Carbomer 980 andCarbomer940 at 0.5 % dispersion solution were utilized to achieve the viscosity and flow modification task. Finally, the best carbomers was examined intensively using viscometer and Rheometer compared viscosity and rheological properties.

Materials and Methods:

The research was performed using Brook field DV II +Pro Viscometer, equipped with LV-5 spindle, 10 rpm, and Anton Paar Rheometer, equipped with CP 50 spindle.

Materials:

Carbomer 980 and Carbomer940 (Pharmacopeia grade)

Apparatus:

Analytical balance capable of ±0.005 gram accuracy.
Fisher or other mixer capable of 300 RPM, with 3.25-inch "S"-blade stirrer.
Constant temperature water bath.
Brookfield Viscometer, DV II +Pro.
Anton Paar Rheometer (MCR-302).
pH meter.

Sample preparation:

Spread sample evenly in an open aluminum or glass dish. Dry at 80°C in a vacuum oven (minimum of 25 inches of mercury) for 1 hour. NOTE: Drying the sample is not necessary if the sample has recently arrived from production and the sample container has not been previously opened.

Measure 500 mL distilled or demineralized water in a graduated cylinder and transfer to an 800 mL beaker.

After drying the Carbomer polymer, remove to a desiccator and allow to cool to room temperature.

After the Carbomer polymer reaches room temperature, weigh out polymer from the dried sample to ±0.005 gram onto an aluminum dish. The appropriate amount of polymer for the mucilage concentrations is 2.50 grams for 0.5% solution.

Place the Carbomer polymer dispersion in a 25 ± 2°C water bath for 30 minutes.

Remove the dispersion from the bath and neutralize with 18% NaOH. Carbomer 980 and Carbomer940 polymers are neutralized to a pH at 7.3.

Use the mixer with the "S"-paddle at low speed (300 to 500 rpm) to stir the mucilage. With the mixer off, set the paddle just below the surface so that air will not be drawn into the mucilage. Turn the mixer on and stir for 2 minutes, moving the beaker up and down, being aware that minimal air should be introduced.

Check the pH of the mucilage with a calibrated pH meter. If the pH is below the target range, add additional 18% NaOH and remix. The desired pH is 7.3 for Carbomer 980 and Carbomer940. If the pH is above the desired pH range, discard and remake the mucilage.

Return the neutralized mucilage to the 25°C water bath for one hour. NOTE: The viscosity determination should be made after 60 to 75 minutes to avoid slight viscosity changes occurring with time.

Test procedure for viscometer:

Take a clean and dry 100 ml Borosil glass beaker. Transfer the Sample into the beaker without air gaps, cover the beaker with aluminum foil and keep it in a calibrated water bath ($25^oC \pm 1^oC$) for 1 to 2 hours to attain the temperature. Measure the viscosity by using spindle LV-5, set the speed 10 rpm, and take the reading.
Assured temperature of sample should be $25^oC \pm 1^oC$. Monitor the temperature by sensor which is attached to viscometer. Dip the spindle at center position of beaker up to the mark on the spindle. After 1 minute take constant reading on spindle.
The Real time viscosity values of Carbomer 980 and Carbomer940at different intervals (Table-1).

Table-1: Real time viscosity at 25^0C, LV-5 spindle, 10 rpm.

Sl.No	Material name	Initial	10 days	20 days	30 days
1	Carbomer 980	74,000	68,100	66,400	65,000
2	Carbomer 940	76,000	75,000	74,500	73,000

The Acceralated viscosity values of Carbomer 980 andCarbomer940at different intervals (Table-2)

Table-2: Acceralated viscosity at 45^0C, LV-5 spindle, 10 rpm.

Sl.No	Material name	10 days	20 days	30 days
1	Carbomer 980	69,000	66,000	64,800
2	Carbomer 940	70,000	61,000	58,500

Test Procedure for Flow curve:

Rheological measurements were performed immediately after pressure treatment using a controlled stress and strain Rheometer (Anton Paar MCR 302, Germany). A parallel plate geometry (50 mm diameter) was used and the gap between the two plates was 0.1 mm. Before each test, the sample was placed between the Rheometer plates for 5 min to allow stress relaxation and temperature equilibration (temperature was kept constant at 25°C). Physical Rheometer Data Analysis software (Rheo compass, version V1.11:173, Germany) was used to obtain experimental data. A rheogram of the samples was plotted using shear rate and shear stress at various revolution rates of the spindle (PP-50).

The Real time viscosity values ofCarbomer980 and Carbomer940 at different intervals (Table-3).

Table-3: Real time viscosity at Initial and 10^0C, PP-50 spindle.

Sl.No	Material name	Initial	10 days	20 days	30 days
1	Carbomer 980	64,584	56,358	21,697	48,784
2	Carbomer 940	43,811	64,640	33,870	54,135

The Acceralated viscosity values of Carbomer 980 andCarbomer940 at different intervals (Table-4)

Table-4: Acceralated viscosity at 45^0C, PP-50 spindle.

Sl.No	Material name	10 days	20 days	30 days
1	Carbomer 980	50,028	26,438	20,672
2	Carbomer 940	37,566	34,565	25,765

Amplitude sweep:

An amplitude sweep test, as an oscillatory test is characterized by a variable amplitude and constant frequency. The term 'sweep' stands for a function with a variable parameter. Either the shear stress (CSS) or the shear deformation (CSD) are controlled. Amplitude sweep tests are conducted to achieve informations about the flow behavior of a substrate and especially its elastic part (stored elasticity), the LVE deformation range, marked as area between the points of the parallel running curves of G' and G" and their transition. The inflexion (transient) point equals the yield point.

In contrast to amplitude sweep tests a frequency sweep test is built up on a variable frequency and a constant amplitude, usually conducted with controlled shear deformation (CSD). As pre-condition the yield stress has to be determined first to assure that measurements are carried out within the LVE range. Curves of the storage modulus G', the loss modulus G" and the complex viscosity |η*| are displayed as a function of the angular frequency ω. alternatively, the complex viscosity |η*| can be replaced by tan δ. Both give informations about the viscous behavior, respectively the portion of viscosity in relation to elasticity. Frequency sweep tests appropriate to investigation regarding to short-term as well as to long-term behavior. Thus, cyclic adaptations of frequencies might be applied, e.g. frequency changes of farm implements (18).

The so called LVE range (linear viscoelastic) analysis is used for determing yield stress' deriving from amplitude sweep tests, which have either deformation γ (controlled shear deformation, CSD) or shear stress τ (controlled shear stress, CSS) as default. In the case of frequency sweep tests, calculations are based upon a Carreau equation (Carreau-Yasuda) and are generated automatically during tests (19).

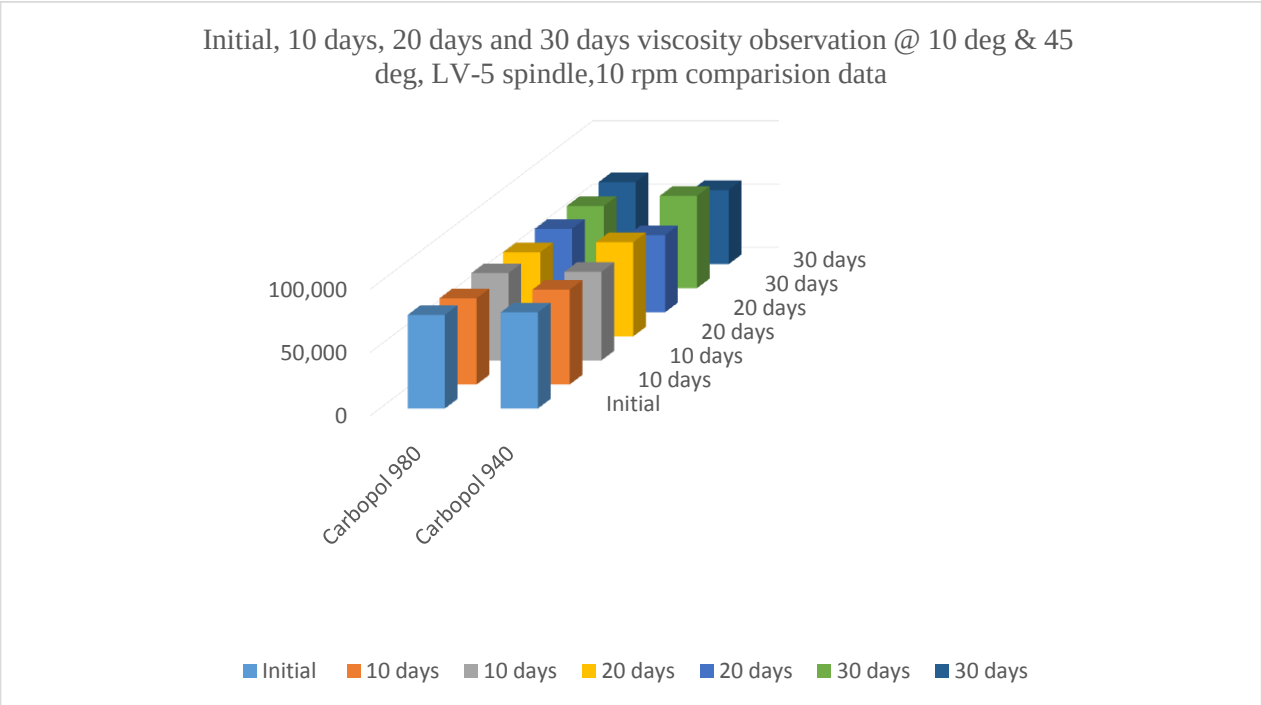
Oscillatory shear responses (G' or elastic modulus, and G" or loss/viscous modulus) were determined at low strains over the frequency range 0.001–100 rad/s. The linearity of viscoelastic properties was verified for all the material at different conditions and different stages.

Results and discussions:

Viscosity properties:

The different Carbomer 0.5 % dispersionand pH-7.3material viscosity property studied at Real time, 10 degree and 45 degree at different intervals like 10 days, 20 days and 30 days by using Brook field DV-II +Pro viscometer,

Fig-I: Initial,10 days, 20 days and 30 days Viscosity profiles at 10 degree and 45 degree, LV-5 spindle, 10 rpm.



The initial,10 days, 20 days and 30 days Viscosity at 10 degree and 45 degree viscosity profiles of Carbomer 980 and Carbomer 940, materials are plotted in Fig-I, the viscosity profiles at 45 degree there is difference initial viscosity,10 days, 20 days and 30 days viscosity profile of Carbomer940material and these two materials

viscosity decreasing at 20 days and 30 days study, the viscosity profile of Carbomer 980 material viscosity slightly decreasing the viscosity at 10 degree and 45 degree from initial 10, 20 and 30 days there no much difference in viscosity, so it shows Carbomer980, at 0.5 % dispersionand pH-7.3 the material isbest for freezer and accelerated cosmetic formulations,

Flow curve:

A flow curve, viscosity versus shear rate, across a wide range of shear rates Newtonian flow is the simplest type, displaying as shear-independent viscosity while the material is sheared. Water and some low-molecular-weight mineral oils are typical examples of Newtonian fluids. Pseudo-plastic or shear thinning fluids display viscosity reduction while the shear rate increases. Typical examples of these are colloidal systems. The colloidal structure breaks down while shear rate increases, displaying reduced viscosity. Dilatant or shear thickening flow, in which viscosity increases with shear rate, is seldom encountered in the pharmaceutical and cosmetics fields.

Steady state viscosities of two samples were measured for a temperature range covering 10 to 45°C at 10 days increments. For clarity, the flow curves at only two different temperatures for samples viscosity flow curve are shown in Fig. II to VIII, It is apparent from Fig. II to VIII that carbomer gels exhibit remarkable temperature stability. For a particular shear rate, viscosity of these materials change appreciably with change in temperature. Weak temperature dependency of carbomers gels is also supported by experimental literature (20 & 21). The temperature stability or insensitivity can be explained in terms of the elastic or cross-link structure of the micro gels thermal fluctuation or increased thermal mobility of the polymer chain strands are suppressed by the cross-link junctions. Therefore viscosity does not change appreciably with temperature.

The flow curves for different temperatures were fitted with Ostwald's model (22) $\tau = K_{\gamma}^{n}$. The fluidity or power law index n in this equation represents departure from Newtonian behavior (n = 1 for Newtonian fluids) and is a measure of pseudo plastic or shear thinning extent of the fluid. Itcan be interpreted as the rate of change of structure with shear rate (γ) (23). The gel network structure can be changed due to deformation induced changes in shapes of the microgel particles, alignment of polymer chain segments, and decrease in the number of entanglements between polymer chain segments and side chains. In accordance with this argument, the values of n will be lower in case of stronger gels due to increased noncovalent forces of attraction between neighboring particles, which increase lifetime of the temporary entanglement junctions.

The Initial, 10 days, 20 days and 30 days Viscosity v/s shear rate at 10 degree flow curve profiles of Carbomer980 and Carbomer 940materials are plotted in Fig-II, III, IV and V, the flow curve profiles at 10 degree there is no much differences in initialto 30 days viscosityand shear rateof flow curve profile of twomaterials but slightly decreasing the viscosity but there is differ in shear rate so it shows at 10 degree the flow cure profiles of Carbomer 980 and Carbomer 940 at 0.5 % dispersionand pH-7.3 are not effectedto Freezer cosmetic formulations

Figure-II: Flow curve, Initial (0.5 % dispersion, pH – 7.3)

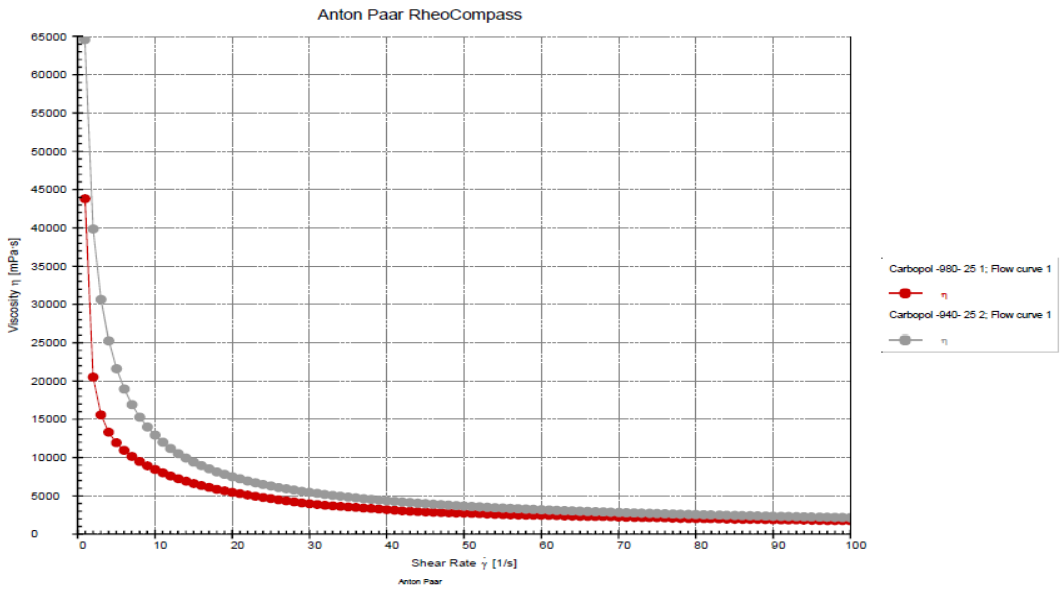


Figure-III: Flow curve, 10 degree- 10 days (0.5 % dispersion, pH – 7.3)

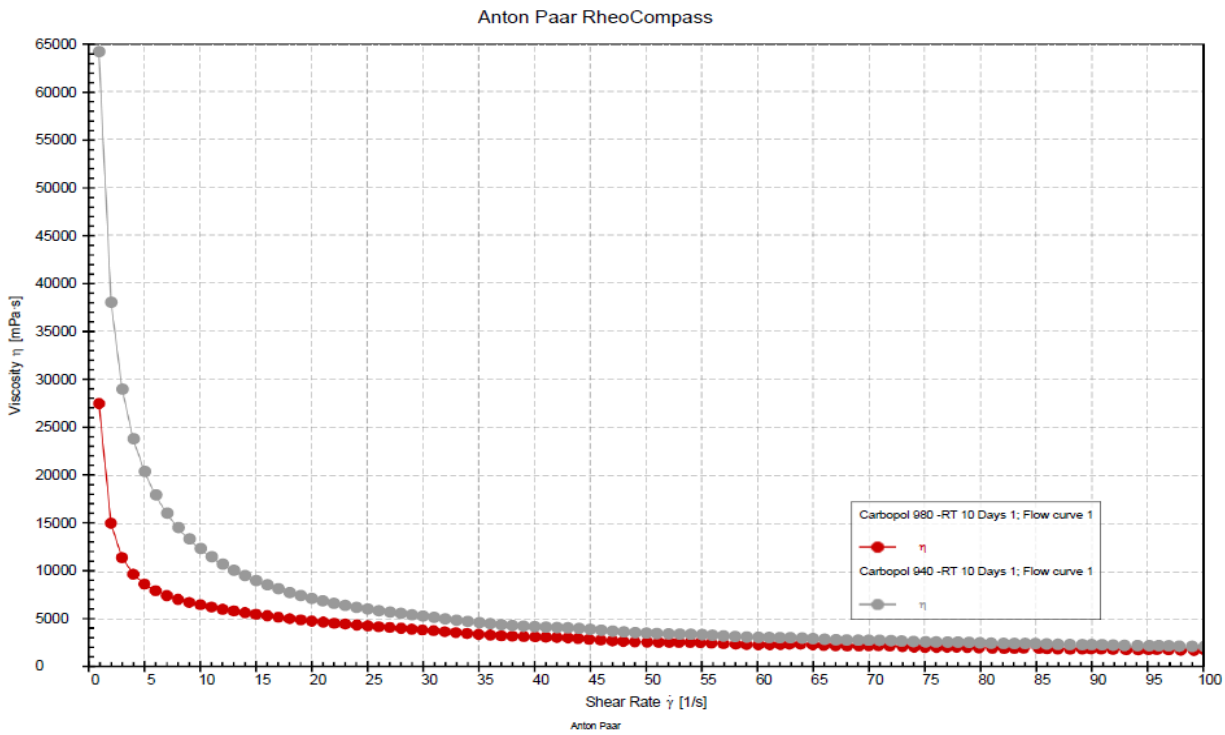


Figure-IV: Flow curve, 10 degree- 20 days (0.5 % dispersion, pH – 7.3)

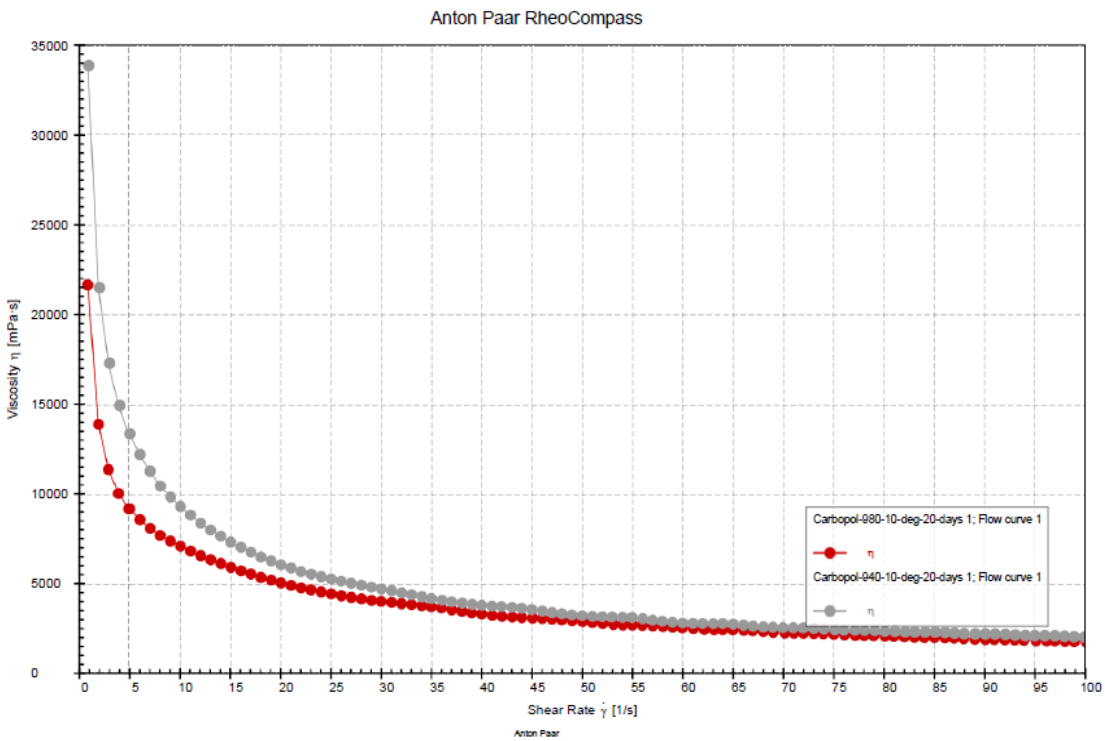
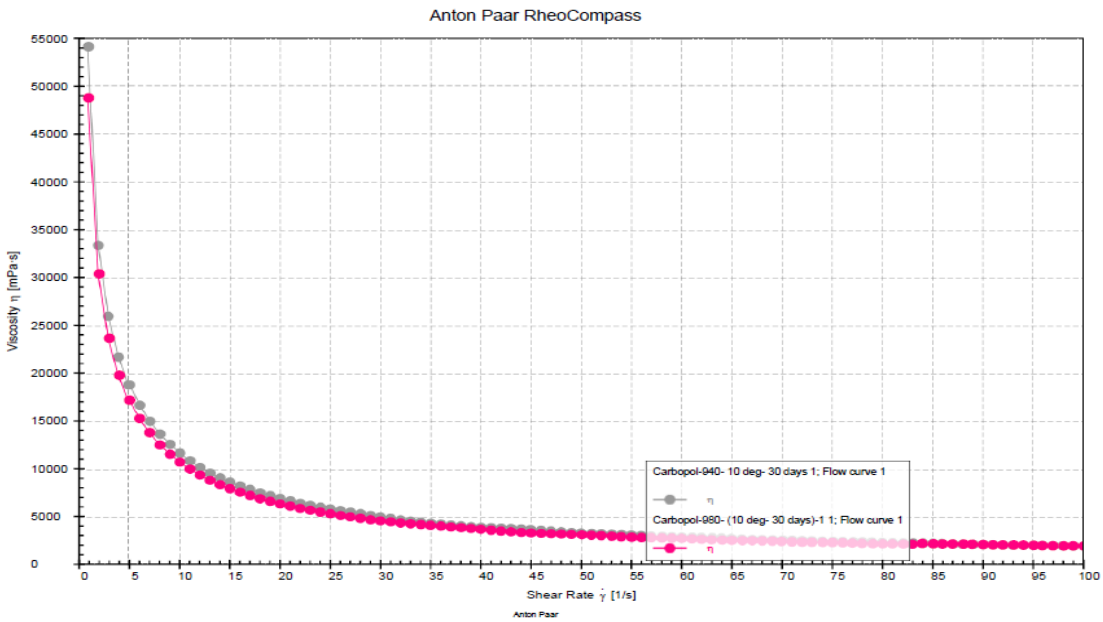


Figure-V: Flow curve, 10 degree- 30 days (0.5 % dispersion, pH – 7.3)



The10 days, 20 days and 30 days Viscosity vs shear rate at 45 degree flow curve profiles of Carbomer 980 and Carbomer 940 materials are plotted in Fig-VI, VII and VIII the flow curve profiles at 45 degree there is much difference in shear rate,10 days, 20 days and 30 days flow curve profile of Carbomer 980 materialslightly decreasing the viscosity, there is no difference in shear rate flow curve profiles, so it shows Carbomer 980 is stable at 0.5 % concentration and pH-7.3 and it is suitable for cosmetic formulations.

Figure-VI: Flow curve, 45 degree- 10 days (0.5 % dispersion, pH – 7.3)

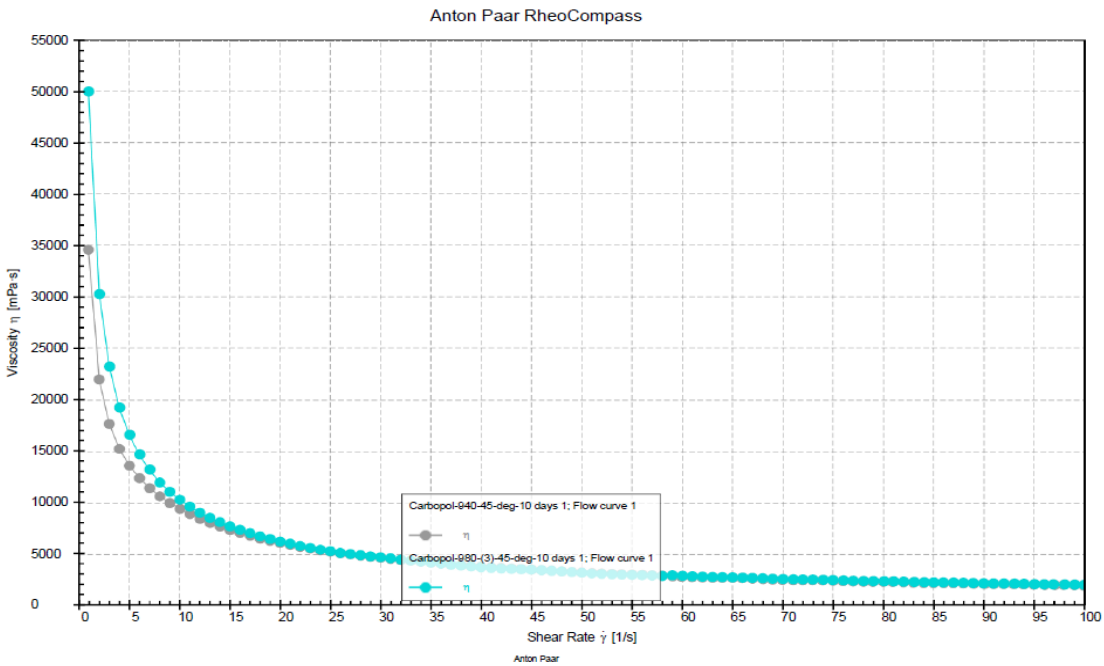


Figure-VII: Flow curve, 45 degree- 20 days (0.5 % dispersion, pH – 7.3)

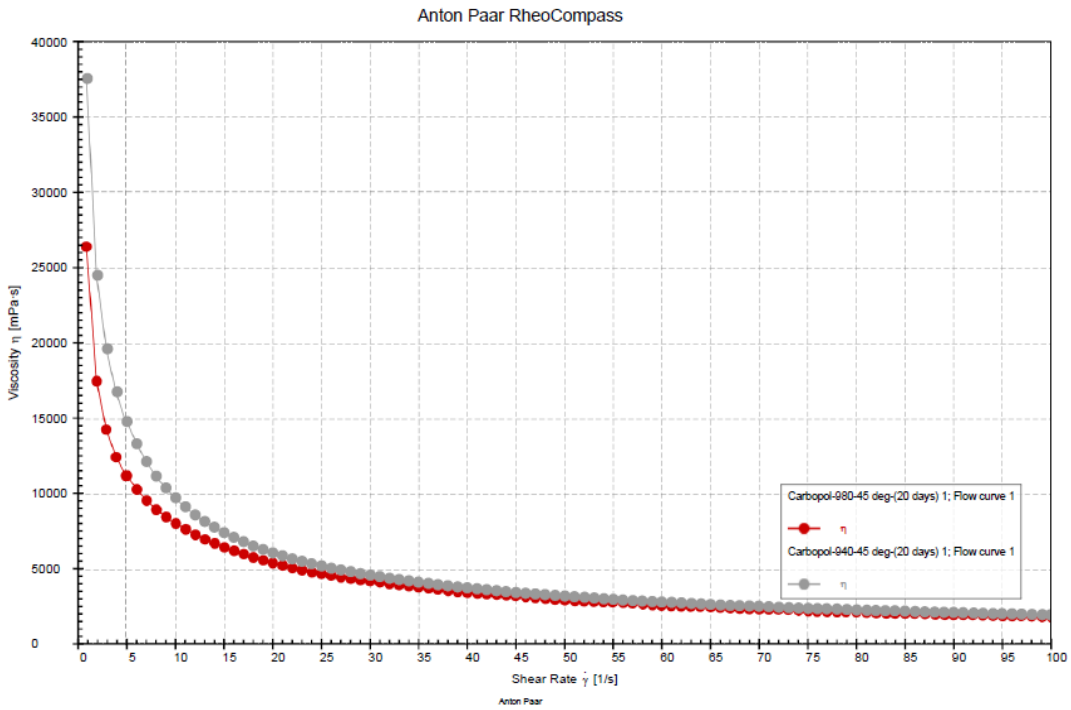
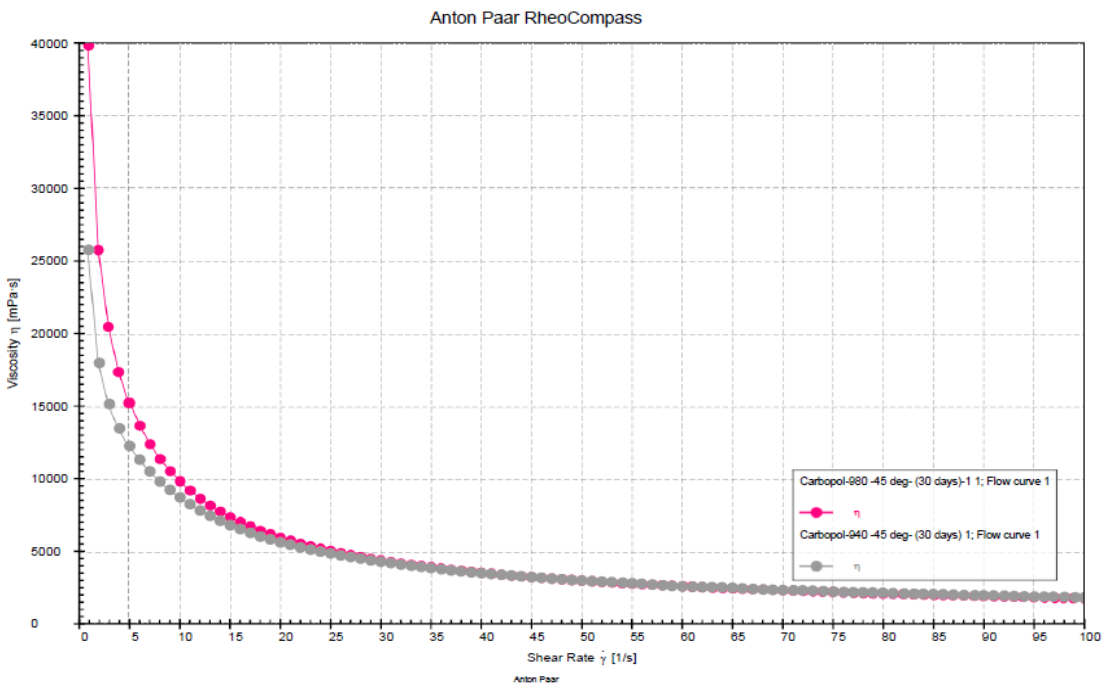


Figure-VIII: Flow curve, 45 degree- 30 days (0.5 % dispersion, pH – 7.3)



Amplitude sweep Test:

Strain sweep experiments were typically performed at constant oscillating frequencies with increased strain from 0.001 to 10. Little differences in the G" and tan(δ) [tan(δ) =G"/G'] profiles of these materials were observed at different constant frequencies (0.01 Hz, 1 Hz, 100 Hz) (Fig. I to IV). The observations further substantiates that the gels' responses are elastic in the frequency range 0.01 to 100 Hz.

As evident from Fig. I to IV, the complex modulus is dominated by the elastic contribution at low strains. For sample Carbomer 980 up to a strain of about 10%, the loss modulus (G") is less than 20% of the elastic modulus indicating full elasticity of the system. In this regime, the gel network can be considered as closely packed hard sphere dispersion. At higher strains, the elastic structure breaks down and consequently the elastic modulus decreases steeply with increasing strain (Fig. I to IV). A crossover strain (γ_c) can be identified above which the gels behave predominantly as liquid because G" becomes greater than G' [tan(δ) > 1]. Because Carbomer concentration is same in all five samples, the breakdown strain is similar (γ_c= 0.8 ± 0.2). The collapse of the gel structure at such low strains is indicative of a closer packing of the microgel particles (24), smaller spheres lead to a lower breakdown strain.

The 10 degree Initial, 10 days, 20 days and 30 days strain sweep experiment were typically performed at constant oscillating frequencies with increased strain from 0.001 to 10. Little differences in the G' and tan (δ) [tan (δ) =G"/G'] profiles of these materials were observed at different constant frequencies (0.01 Hz, 1 Hz, 100 Hz) (Fig. I to IV). The observations further substantiates that the gels' responses are elastic in the frequency range 0.01 to 100 Hz, at 10 degree strain sweep experiment of Carbomer 980 and Carbomer 940samples are plotted in Fig-I, II, III and IV, the elastic structure breaks down and consequently the elastic modulus decreases steeply with increasing strain. A crossover strain (γ_c) can be identified above which the gels behave predominantly as liquid because G" becomes lesser than G' [tan (δ) < 1]. Because Carbomer concentration is same in all five samples, the breakdown strain is similar. The collapse of the gel structure at such low strains is indicative of a closer packing of the microgel particles(24), smaller spheres lead to a lower breakdown strain.

At 10 degree strain sweep experiment of Carbomer 980 and Carbomer 940materials are plotted in Fig-I, II, III and IV, the elastic structure not breaks down and consequently the elastic modulus stable with increasing strain. A crossover strain (γ_c) can be identified above which the gels behave predominantly as liquid because G" becomes greater than G' [tan (δ) > 1]. Yield stress can be defined as the minimum stress that must be applied before the starts to flow (25). This is an important parameter for carbomers. Yield stress of Carbomer 980 material the cross linked microgel structure where individual particles are closely packed with their neighbors is responsible for yield stress. The magnitude of the yield stress is a measure of the strength of the closed pack structure that must be exceeded for the material to flow appreciably.Because Carbomer 980 yield stress value is more compare to Carbomer 940.

Figure-I: Amplitude sweep initial (0.5 % dispersion, pH – 7.3)

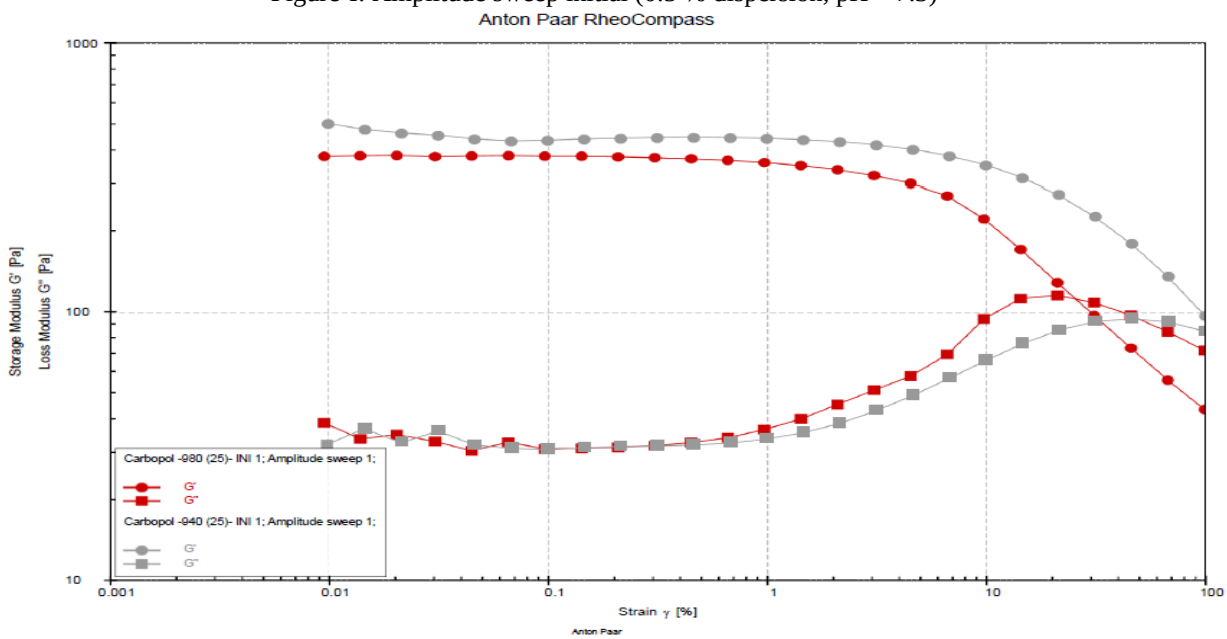


Figure-II: Amplitude sweep, 10 degree-10 days (0.5 % dispersion, pH – 7.3)

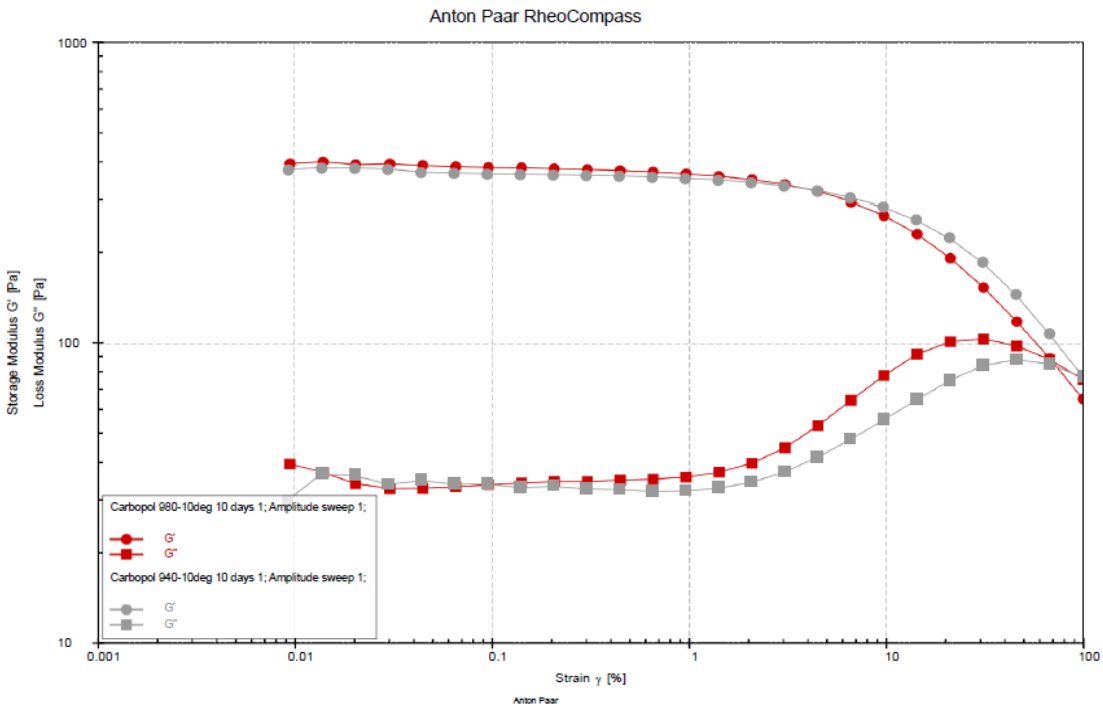


Figure-III: Amplitude sweep, 10 degree-20 days (0.5 % dispersion, pH – 7.3)

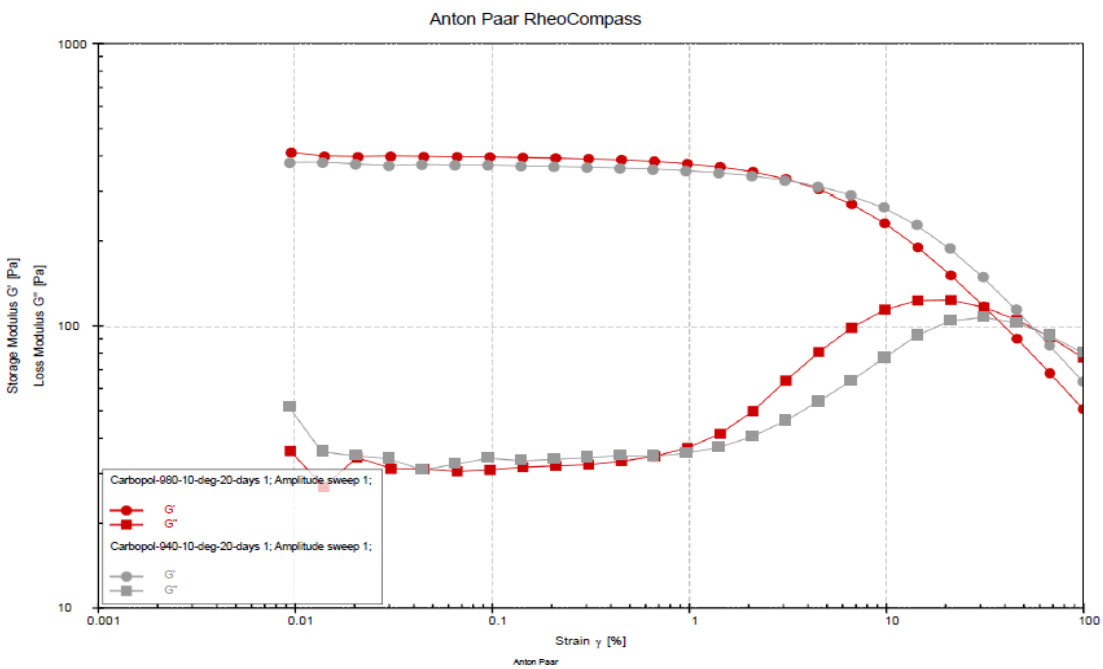
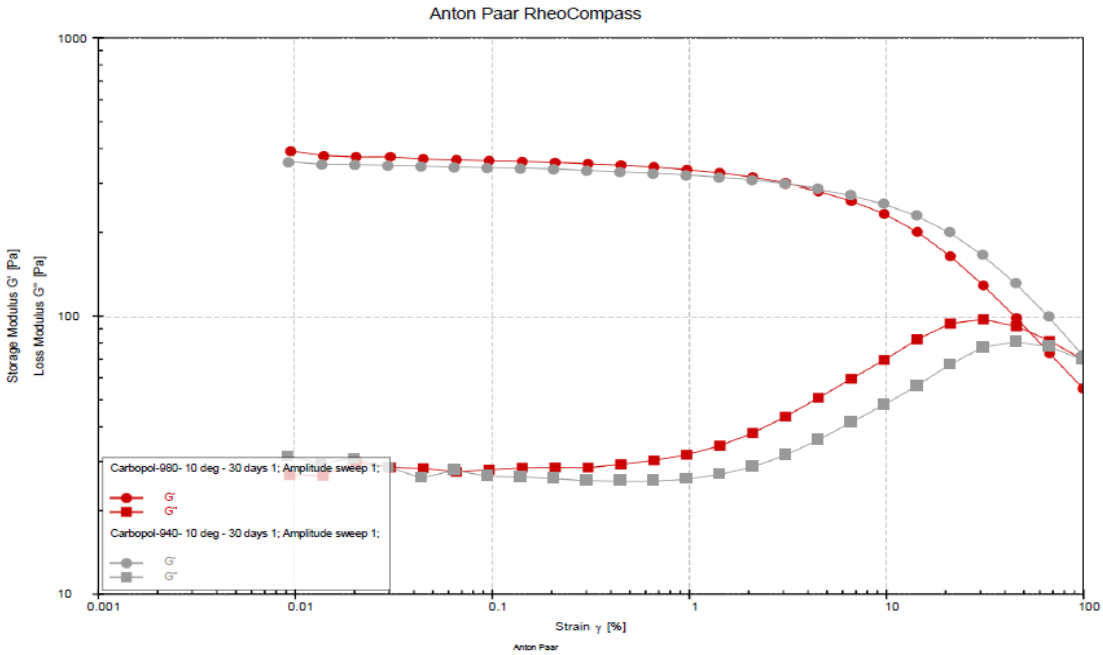


Figure-IV: Amplitude sweep, 10 degree-30 days (0.5 % dispersion, pH – 7.3)



The 45 degree, 10 days, 20 days and 30 days strain sweep experiment were typically performed at constant oscillating frequencies with increased strain from 0.001 to 10. Little differences in the G' and tan (δ) [tan (δ) =G"/G'] profiles of these materials were observed at different constant frequencies (0.01 Hz, 1 Hz, 100 Hz) (Fig. V to VII). The observations further substantiates that the gels' responses are elastic in the frequency range 0.01 to 100 Hz, at 45 degree strain sweep experiment of Carbomer 980 and Carbomer 940materialsare plotted in Fig-V, VI and VII, the Carbomer 940 elastic structure breaks down and consequently the elastic modulus decreases steeply with increasing strain. A crossover strain (γ_c) can be identified above which the gels behave predominantly as liquid because G" becomes lesser than G' [tan (δ) < 1].BecauseCarbomerconcentration is same in twomaterials, the breakdown strain is similar. The collapse of the gel structure at such low strains is indicative of a closer packing of the microgel particles(24), smaller spheres lead to a lower breakdown strain.

At 45 degree strain sweep experiment of Carbomer 980 and Carbomer 940 materials are plotted in Fig-I, II, III and IV, the elastic structure not breaks down and consequently the elastic modulus stable with increasing strain. A crossover strain (γ_c) can be identified above which the gels behave predominantly as liquid because G" becomes greater than G' [tan (δ) > 1]. Yield stress can be defined as the minimum stress that must be applied before the starts to flow (25). This is an important parameter for carbomers. Yield stress of Carbomer 980 sample the cross linked microgel structure where individual particles are closely packed with their neighbors is responsible for yield stress. The magnitude of the yield stress is a measure of the strength of the closed pack structure that must be exceeded for the material to flow appreciably. Because Carbomer 980 yield stress value is more compare to Carbomer 940.

Figure-5: Amplitude sweep, 45 degree-10 days (0.5 % dispersion, pH – 7.3)

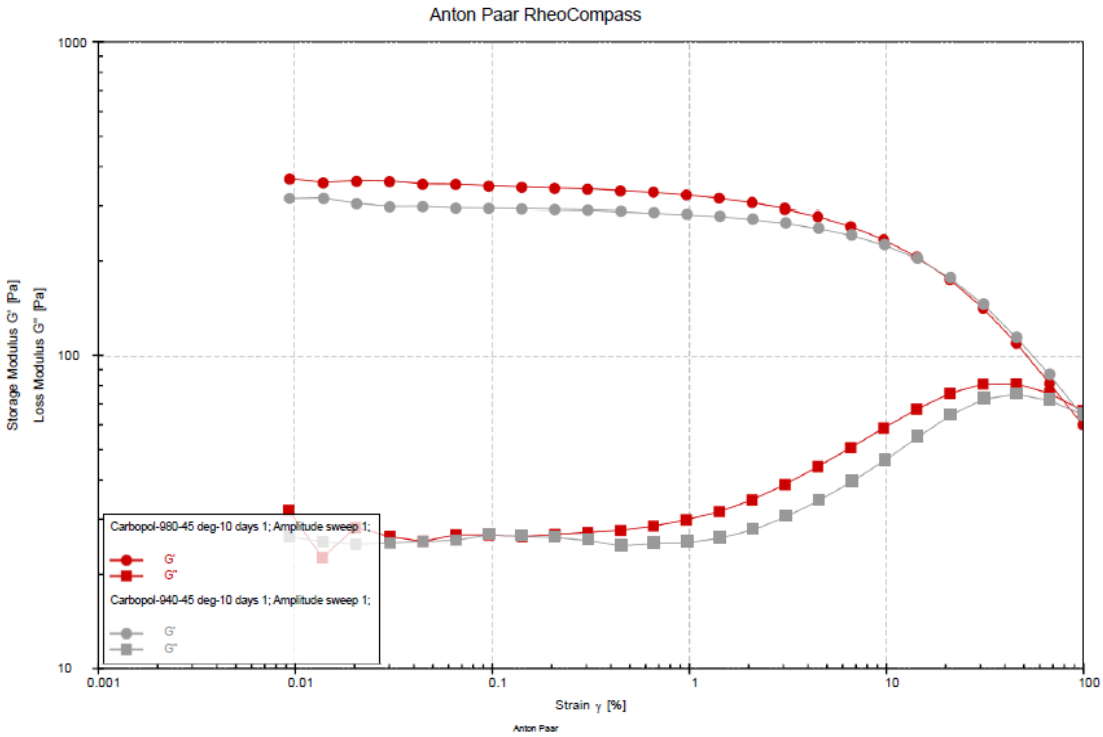


Figure-6: Amplitude sweep, 45 degree-20 days (0.5 % dispersion, pH – 7.3)

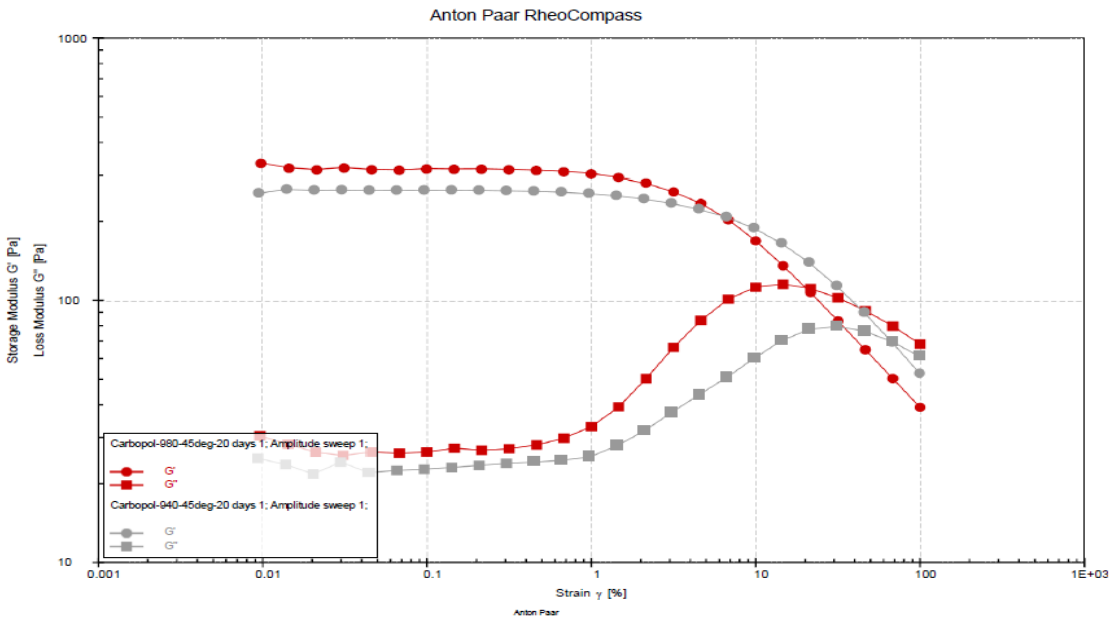
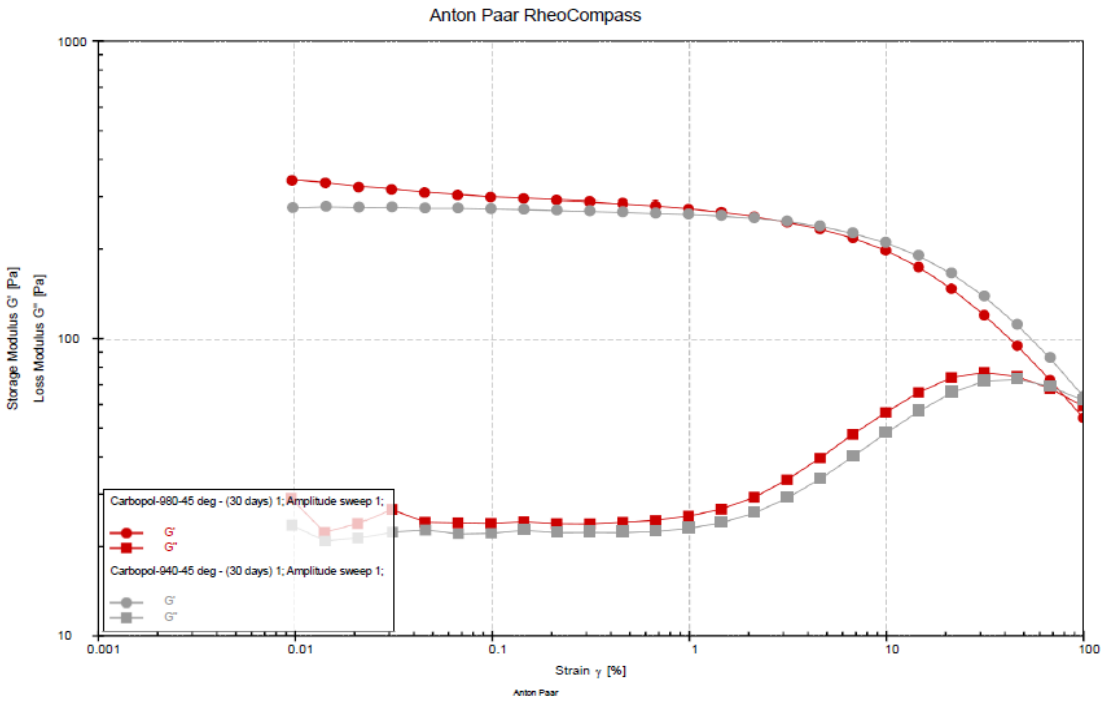


Figure-7: Amplitude sweep, 45 degree-30 days (0.5 % dispersion, pH – 7.3)



Conclusions:

From this study, it can be concluded that out of two pharmacopeia gradesof Carbomers used neutralized with 18% NaOH by pH 7.3, and 0.5 % dispersionCarbomer 980 was found to be the best in modifying the rheological and viscosity propertied of nano-scaled emulsion designed for topical application.

Neutralizing 0.5 % dispersion of Carbomer 980 by 18% NaOH made this polymer stronger as a gelling agent and as a rheology modifier, since the calculated intrinsic viscosity of the sample studied. Yield stress is a critical parameter for characterizing a wide variety of complex fluids, and is a key factor for many real-life processes and applications involving Carbomer 980 material. In order to obtain relevant, robust and reproducible yield stress. The excellent rheology and suspension performance, efficient thickening, able to thicken over a broad pH range, including low pH system, electrolyte tolerance, rich sensory, high clarity to use, and it is better application of cosmetic facial lotions and gels, body lotions, creamsand sunscreen products.

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A theoretical approach to overcoming the challenges valuing Agricultural Property (Asset) for various purposes in Awka Anambra State, Southeastern Nigeria.

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ABSTRACT: The study focused on a theoretical approach toovercoming the challenges encountered while valuing agricultural property (asset) for various purposes. The farm produce (products) were thoroughly considered with reference to sales and emphasis on profit drawn.It also considered the methods to be adopted valuing various assets of the farm including plant and machinery. While valuing such complex property, the method of valuation adopted for various assets including the farm produce (products) were considered with a view of overcoming the challenges on ways to carrying future valuations on such agricultural property.This study no doubt considered the various purposes for which the agricultural property is being valued and made some specific findings with respect to what constituted challenges while carrying out valuation for agricultural properties and ultimately proffered solutions to identified challenges.
KEYWORDS: Challenges, Agricultural Property, Asset, Valuation.

1.0 INTRODUCTION

This study was limited to the challenges encountered while valuing agricultural Properties for various purposes in Awka, Anambra South eastern Nigeria.

The study covers only a geographical area of Awka, due to the relatively high commercialized and urbanized nature of Awka and for the purpose of Convenience, a brief (insight)/trend in valuation of Agricultural Property in Awka were used as data for this study. The study highlights the challenges encountered by Valuers in such valuation.

It therefore examined the challenges encountered by the Valuers and proffered solutions to the identified challenges.

2.0 PROBLEMS

The key issue in business expansion is finance, also real estate which agricultural property is part of requires huge financial/capital outlay to bring it into limelight.
Where farmers seek for fund to expand their farm for more profit and possibly meet ever increasing demand for agricultural products especially in urban center, finance and financing option has always been a major challenge.
When Valuers are approached by farmers to advices on the finance option, he has to sit down and analyze various finance optionavailable as well as check the major reason why the client(s) is seeking for more fund.
When he is settled for the finance option, the next would be the challenge on how to value such complex property which rarely comes up for valuation. He is also faced with problems of the best and fair valuation method to adopt, apart from that the Valuer also faces the challenge of how to value farm produce; he must place value on them.
Also facing the Valuer is how to gather data needed for analysis of sales, these however is needed in preparation of loan repayment schedule and possibly advice the client on how to go about the servicing of such loan.
These challenges therefore prompted the study of the challenges encountered while valuing agricultural property for various purposes.

3.0 REVIEW OF RELATED LITERATURE

This chapter helps to paint a clearer pictures of the various terms frequently used in valuation of agricultural property (asset) for various purposes. It also reviews the works of other researchers on the topic of this critical analysis. In this critical analysis, there is need to define the terms;

3.1 Valuation Concept and definition

Valuation of landed property or real estate appraisal is a process of establishing an opinion of value for an interest in landed property/real estate. RICS (2006) describes a valuation as ‘a professional individual’s opinion

of the capital or rental price or value of a property on a defined basis'. Market valuation is a profession that has its roots in land economics and investment appraisal.

3.2 Agricultural Property (Asset) Definition

Agricultural property has been defined in many ways, in dictionary of Real Estate Appraisal, agricultural property is defined as improved or unimproved land that is devoted to or available for the production of crops and other products of the soil, for example, fruits, timber, pasture and building for livestock.

However, the aforementioned definition should cover plant, machinery and equipment used for agricultural production, for example, production of day old chicks, etc. Udechukwu. (2008) defined agricultural properties as properties used for the cultivation of crops and rearing of animals, for example bare farm land, farm house, ranches, orchards, pasture land, cottages, etc. put together. Therefore, agricultural properties can simply be defined as properties, whether land, buildings, plants, machinery and equipment, used for agricultural purposes.

Agricultural properties are lands suitable to or used for the production of a wide range of commodities intended directly or indirectly for human consumption Ogunba. (2013).

Assets of agricultural property for valuation include the land, the structural improvements, plants and machinery attached to the land, plant and machinery not attached to the land, biological assets (living animals or plants) attached to the land and biological assets not attached to the land (IVS, 2007).

3.2.1 Classifications/Components of/an Agricultural Property

The agricultural uses of land may be classified in the following broad groups (IVS, 2007):

1. Crop farms.
2. Dairy Farms.
3. Perennial plants.
4. Forestry/Timberland.
5. Irrigation land.
6. Livestock Ranches/Stations.
7. Special Purpose Properties.

The components of a farm which were articulated by Kuye. (2003) can be summarized as follows:

1. Farmland.
2. Farm roads.
3. Farm House/Buildings.
4. Irrigation Facilities.
5. Plant and Machinery
6. Fences.

3.3 Agricultural property Valuation.

Kuye opined that valuation of agricultural properties is one aspect of valuation that is scarcely carried out (especially in the tropics) when compared to other aspects such as valuation of residential properties, special properties, etc. This, he noted, has made it subject of interest in both the academic and professional circles. The consideration of agricultural properties does not change the definition or meaning of valuation – the art and science of determining the value of an interest(s) in property for a specific purpose or purposes, at a specific date(s), after taking into consideration the nature of the property and state of the market. This definition covers all classes of property, be it residential, commercial, industrial, agricultural, etc.

In the furtherance of the aforementioned, it is essential to mention that the final value to be arrived at an agricultural valuation represent an aggregate value of the various components of the subject farm/agricultural property. But this depends on the purpose, basis and method of valuation which one decides to adopt. For instance, if a Valuer is Valuing for sale/purchase using the income/investment method, he may not use aggregate values but rather capitalize the net from the investment. However, a method such as Depreciated cost (DRC) method will involve aggregating the depreciated replacement cost of the various components of the farm or agricultural investment.

3.4 The Valuation Exercise

The valuation of *farm quarters is expected to be done using investment method; this applies to the farm office, and warehouse.* The reason being that the property is believed to be beneficially occupied and generating income flow; the investment method of valuation can therefore be considered as the most appropriate for the exercise. Due consideration must be given to the present cost of building materials will result in rentals not reflecting the income flow commensurate on such property. To reduce this, Valuers should therefore apply "Security Factor". This is the coefficient of open market rental value over the prevailing rental. The present cost of building materials is expected to compel Valuers to use the replacement cost approach as a check to arrive at a fair Open Market Value. The investment method sums up the total of the projected income making provisions

for outgoings. The cost method on the other hand contemplates the cost of putting up similar structures based on prevailing priced bill of quantities for such property and the value of site improvements less appropriate percentage for depreciation and obsolescence.

The two methods can be correlated and which will form the basis of any conclusive opinion.

For valuation of *fish ponds, farm quarters, farm offices, warehouse, hatchery block, parent stock house, holding pen house, brooding house.* Depreciated Replacement cost DRC, should be considered appropriate because the structures do not rarely come to market and mostly its comparable cannoteasily be found and there has not been evidence of let or even sale of such in recent times.

In valuation for plants and machineries, various methods should be considered in order to arrive at a fair opinion of value. Replacement cost method should be used while market comparism and book value method should be adopted as a check.

In servicing of loans; emphasis should be made in relation to profit/sale made from the sale of eggs, broilers, fishes and old layers, this applies to other farm produce not itemized. They should however be compared with other farms in the town. The sizes of eggs and boilers should be considered in terms of weight. This applies to fishes (cat) as they are sold based on the weight in kilograms (kg). It is however of importance that maturity of the farm produce (product) e.g. (chicken and fishes) produced are taken into consideration while trying to estimate profits. Seasonality in sales should also considered as sale of broilers witness high patronage especially during festive period.

4.0 METHODOLOGY/APPROACH/DATA PRESENTATION AND INTERPRETATION

Data was collected from the consultants, practicing Estate Surveyors and Valuers as well as farm owners and their employees within Awka. The questionnaire was used to obtain the required information which will help Valuers to arrive at the final opinion of value. Oral interview were also held with practicing Valuers and farmers alike who also gave an in-depth account of methods of valuation and farm operations. This highlighted challenges and provided a basis of analysis that will guide the drawing of conclusion and recommendation. Reconnaissance survey was conducted and should constantly be conducted as need be to obtain firsthand information on farm operations and Valuers who have done farm valuation in past were also interviewed; in addition to survey is observation.

Questionnaires were designed and administered to practicing Estate Surveyors and Valuers. To the farm owners and their employees; more of interviews were done and expected to be done when need arises.

Simple random sampling technique was used and evenly spread and without bias, 50 questionnaires were distributed in all and a total of 41 were returned. Respondents were required to rate the challenges and recommendation based on 5 point likert scale ranging from ***Unimportant to Very Important*** and ***Strongly Disagree to Strongly Agree***, i.e. from 1 – 5, with point 5 representing very important and strongly agree respectively. In analyzing data collected, the use of descriptive statistical tools of analysis through the use of simple percentages was adopted.

4.1 DATA PRESENTATION

TABLE 1: AGE OF RESPONDENTS

AGE OF RESPONDENTS	NUMBER	PERCENTAGE
20 – 29	17	41.46%
30 – 39	16	39.02%
40 – 49	5	12.19%
50 and above	3	7.31%
TOTAL	41	100

TABLE 2: GENDER

GENDER	NUMBER	PERCENTAGE
Male	30	73.17%
Female	11	26.82%
TOTAL	41	100

TABLE 3: EDUCATIONAL QUALIFICATION OF RESPONDENTS

EDUCATIONAL QUALIFICATION	NUMBER	PERCENTAGE
School certificate	9	21.95%
Diploma	2	4.87%
BSc / B Tech / HND	27	65.85%

Post Graduate	3	7.31%
TOTAL	41	100

TABLE 4: DATA PRESENTATION ON CHALLENGES ENCOUNTERED BY VALUERS VALUING AGRICULTURAL PROPERTIES AND SCALES

S/NO	Challenges	5	4	3	2	1
1	Inaccurate data presented by the farm operators/owners.	19	17	-	4	1
2	Unwillingness of farm owners/operators to volunteer the accurate information with respect to sale and profit made from the farm proceed.	18	18	1	3	1
3	Unwillingness on the part of farm owners/operators to present invoices for machineries and plants purchased.	17	19	-	5	-
4	Valuers inexperience of farm operations and management leading to poor access to knowledge and judgment on the things to value.	21	18	1	1	-
5	Absence of evidence on recent information sales/let of similar property.	23	15	2	1	-
6	Absence of data base for information on Agricultural property.	17	21	-	2	1
7	Inaccurate data presented by the farm operators/owners.	18	22	-	1	-

TABLE 5: DATA PRESENTATION ON SOLUTIONS/RECOMMENDATIONS TO CHALLENGES FACED WHILE VALUING AGRICULTURAL PROPERTIES.

S/NO	Challenges	5	4	3	2	1
1	There is need for data base for were information can be stored and sourced.	18	21	1	1	-
2	Valuers to always visit relevant websites and source for information on plant and machinery there are valuing.	21	14	2	3	1
3	There is need to visit other farms part from the subject farm for information.	18	19	1	3	-
4	Valuers to observe with keen interest the operations going on in the property they are inspecting for valuation.	19	20	1	1	-
5	Valuers to have one on one interview or contact with employees in order get more and reliable information especially in relation to sales of agricultural products.	17	19	2	2	1
6	Effort to be to have MCPD on valuation of agricultural properties.	21	17	1	1	1
7	Valuers must familiarize themselves on farm operations by visiting the farm.	18	20	2	1	-
8	Need for proper use of other methods of valuation as a check against the other.	19	17	2	2	1
9	Strict adherence to valuation standard and Guidance notes on valuation of agricultural properties.	17	19	2	1	2

5.0 FINDINGS, CONCLUSION AND RECOMMENDATION.

Some challenges usually feature in valuation of different types of property but that of agricultural property is usually peculiar because valuers are not always familiar with such property especially the operations of farm.
The following are findings in the course of this research.

1. Inaccurate data presented by the farm operators/owners.
2. Unwillingness of farm owners/operators to volunteer accurate information with respect to sale and profit made from the farm proceed.
3. Unwillingness on the part of farm owners/operators to present invoices in case machineries and plants purchased.

4. Valuers inexperience of farm operations and management leading to poor access to knowledge and judgment on the things to value.
5. Absence of evidence on recent information sales/let of similar property.
6. Absence of data base for information on Agricultural property.

5.2.1. CONCLUSION AND RECOMMENDATION

It can be concluded that valuation for agricultural properties have some challenges, it takes experience, diligence and further consultation of research materials and visit to farms for one to familiarize him/herself on farm operation.

Based on the challenges encountered while valuing agricultural properties for various purposes, the following recommendations will help in arriving at a fair and final opinion of mortgage value:

It is recommended that when a Valuer notices some fowl play and inaccuracy in terms of data presented by farm owners/operators, the Valuers should go extra mile and sourced for right information by asking questions from other farms around.

The Valuers needs the knowledge of farm operations, this is critical in valuation of agricultural property, he may not necessarily become a farmer but establishment of small farm at his backyard as this will equally help him have some idea of how these products mature and are sold; and even visits of similar farms apart from the one valuing.

Development of a data base for agricultural properties is also very essential to valuation of any agricultural property, it is expected that when such data is developed, even though that there are no evidence of recent sale for such property, one can have idea of the sales from the farm produce and its prices in the market.

Summarily, the recommendations are as follows:

Estate Surveyors should work at developing a data base and devout some pages in the data base or website for agricultural properties and valuation and work at updating it in full assistance with farm owners/operators.

While carrying out valuation of such nature, the Valuers should as matter of importance visit other farms in order to get accurate information in matters relating to sales of agricultural products.

Observation also is very essential, this will reveal to Valuers, the sizes of the farm products and price tags even without the Farm owners/operators volunteering the same information. From observation the Valuers can estimate the prices of fishes among others.

It is expected that Valuers should also contact workers/farm attendants one on one in away the farm owners would not know what is going on as they are also in a better position to volunteer certain information in relation to sales and profits.

It is recommended also that data base development is very critical, when this is developed Valuers should bemeant to deposit valuation reports done by their respective firms to be made accessible with some securities attached to avoid unnecessary duplication, i.e. the valuation reports can only be readable not downloadable.

There should National MCPD will shall be designed to focus mainly on the valuation of agricultural properties, in addition to this is devoting or introduction of course on farm operations and management in schools or better still Estate School developed for one year internship or practical study on valuation profession as opposed to the issues of filling log book and writing synopsis and critical analysis before becoming registered.

Use of one method of valuation as checkagainst the other is also very important as this will go a long way in arriving at the fair opinion of value.

Conclusively, it is expected that when the above recommendations are taking into practice, valuation of agricultural properties will be done at ease without numerous challenges.

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INVESTIGATING THE CONCENTRATION OF ^{226}Ra IN CONCRETE BLOCK AS RAW MATERIALS FOR BUILDING IN KATSINA STATE

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ABSTRACT: Twenty (20) samples of concrete blocks from different local government in Katsina state were measured using gamma spectroscopy with NaI (TL) detector. Three naturally occurring radionuclides and their activity concentrations were determined, that is ^{226}Ra, ^{232}Th and ^{40}K. The activity concentrations for ^{40}K ranged from 46.11 ± 1 to 826.59 ± 4.82 Bq/kg, the activity concentration of Radium (^{226}Ra) ranged from10.19 ± 2.43 Bq/kg to 75.09 ± 4.98 Bq/kg and the activity concentration of Thorium (^{232}Th) ranged from2.77±9.59Bq/kg to 105.13 ± 9.25Bq/kg. The highest value 826.59 ± 4.82Bq/kg was recorded from ^{40}K; the highest value of ^{226}Ra was obtained from the measurement 75.09 ± 4.98 Bq/kg and also the highest value obtained for (^{232}Th) 105.13 ± 9.25Bq/kg respectively. The calculated radium equivalent of (375.10 Bq/kg) shows that it has higher value from sample BS 04 (Jibiya L.G.A) which is Grater than the recommended limit set in the OECD report (370 Bq/kg). And also when compare with (UNSCAER, 2000), the terrestrial radiation it's evident that the data obtained from measured samples gives higher value. The results obtained from other Local Governments were found to be lower than the recommended limit **370** Bq/kg for public exposure and control recommended by International Commission on Radiological Protection (ICRP) and Organization for Economic Cooperation and Development (OECD). The paper also offered Recommendations for public exposure to Radium 226 (^{226} Ra).
Keywords: Radiation, Concrete block, Radiation, ^{226}Ra, ^{232}Th and ^{40}K Concentrations Radium equivalent

Introduction

Radioactivity is the spontaneous disintegration of atomic nuclei, the nuclei emits α - particles or electromagnetic rays during the process of disintegration. (*http/worldwide/liberary.org/1740/ext/Radiation level*).

The world is naturally radioactive, and around 90% of human radiation exposure arises from natural sources such as cosmic radiation, exposure to radon gas and terrestrial radiations. Significant natural occurring radionuclides present in soil are ^{238}U, ^{232}Th, and ^{40}K. (Harb *et al*., 2010).

However, since these radionuclides are not uniformly distributed, the knowledge of their distribution in soils and rocks play important role in radiation protection and measurement. Some of these exposures are fairly constant and uniform for all individual persons everywhere, for examples, the dose acquire from ingestion of ^{40}k in foods. Other exposures vary depending on location. The concentration of Uranium and Thorium in soils is important. High level of Uranium and its decay products in soil and rock, and thorium in sands are the main sources of high natural background of radiations that have been identified in several areas of the world (UNSCEAR, 2000). It is also established that ionizing radiation may cause damage to human bodies and other biological systems. (Arafa, 2004, Darko *et al*., 2005).

All building materials contain various amount of radioactivity, example materials derived from rock and soil contains natural radionuclides of (^{238}U) and thorium (^{232}Th) series and the radionuclides isotope of potassium^{40}K (McAulary *et al*., 1989).

Radiation exposure due to the building materials can be divided into external and internal exposures. The external exposure is caused by direct gamma radiation, whereas the internal exposure is caused by the inhalation of radioactive inert gas radon (^{222}Rn, a daughter product of ^{238}U), it is important to study the radioactivity emitted by the building materials (Leung *et al*., 1998).

Building Materials contains radionuclides of uranium and thorium series as well as ^{40}K, the earth also contains numerous radioactive elements and also it is the origin of NORM since the formation of the world (Amrani and Tahta, 2000). In recent time attention has been paid for to artificial radionuclides or natural origin,

though it is known that contribution of artificial radionuclides in our environment is much smaller (UNSCEEAR, 2005). Natural radionuclides in building material such as concrete block, significantly component of background radiation exposure of the global population.

The radiation which humans are exposed to may increase if they live in houses or building constructed using materials whose radiation doses are above normal background radiation level (Cliff *et al*., 1998). The radiological implication of living or working in buildings made from this building material is increase in internal exposure to gamma-emitting radionuclides. A number of studies on radioactivity in building material have been carried out in different countries around the world for the purpose of estimating the population exposure to natural background radiation. (Otoo *et al*., 2011; Duenas *et al*., 2000; Mohamed, in 2011; Veiga *et al.*, 2005, Nura, 2014).

Result from this study will provide useful data and information on radioactivity levels in building materials and aid in decision making in setting guidelines for the control of radiation exposure in dwellings in Katsina state. It will also serves as guidelines for further research in (NORMS) in all types of building materials in different area in the country.

This paper intends to measure the concentration of NORMs particularly (^{226}Ra) in building materials (Concrete Block) and compare with world wide acceptable limit recommended by IAEA, OECD And UNSCEAR 2000, 1993.

Material and Method

Materials used:

- Building blocks (Which comprises cement, water, sand and gravels)
- Polythene bag
- Rubber container (cylindrical container 7cm by 6cm diameter on height)
- Crushing machine (crusher)
- Vaseline
- Candle wax and Masking tape

Sample collection

In this research, twenty (20) samples of building blocks were collected randomly from some block making industries in different local governments in Katsina State. Katsina state is located in the North western part of Nigeria sharing boundary with Niger Republic, Zamfara State, Kano and Kaduna State. The block industries from which samples were collected as well as the various Local Government which these block industries fall are listed in table 1.

Table 1: Sample collection industries and their respective locations

S/N	SAMPLE ID	NAME OF INDUSTRY	ADRESS	Local Govt. Area
1	BS 01	Umkha Block Industry	Along Zango Road, Daura	Daura
2	BS 02	Alheri Block Industry	G.R.A Katsina	Katsina
3	BS 03	Alheri Block Industry	Funtua Road Dutsin-Ma	Dutsin-ma
4	BS 04	Albarka Block Industry	Along Katsina Road Jibiya	Jibiya
5	BS 05	Alheri Block Industry	Near N.N.P.C Mega Station Dutsin-ma	Dutsin-ma
6	BS 06	Albarka Block Industry Kankia	Katsina Road, Kankia	Kankia
7	BS 07	Commander Block Industry	Funtua Road , Malumfashi	Malumfashi
8	BS 08	Musawa Block Industry	Matazu road Musawa	Musawa
9	BS O9	A.G Block Industry	Matazu	Matazu
10	BS 10	Alheri Block Industry	Zaria Road, Jabiri Funtua	Funtua
11	BS 11	Dandume Block Industry	Dandume	Dandume
12	BS 12	Faskari Block Industry	Faskari	Faskari
13	BS 13	Bakori Block Industry	Funtua road, Bakori	Bakori
14	BS 14	Kankara Block Industry	Dutsin-ma Road Kankara	Kankara
15	BS 15	Danja Block Industry	Zaria Road	Danja

16	BS 16	Madugu Block Industry	Jibiya road	Batsari
17	BS 17	Danmusa Block Industry	Yantumaki Road	Dan-musa
18	BS 18	Kaita Block industry	Dankama road	Kaita
19	BS 19	Bindawa Block Industry	Bindawa	Bindawa
20	BS 20	Al-Amin Block Industry	Katsina road	Charanchi

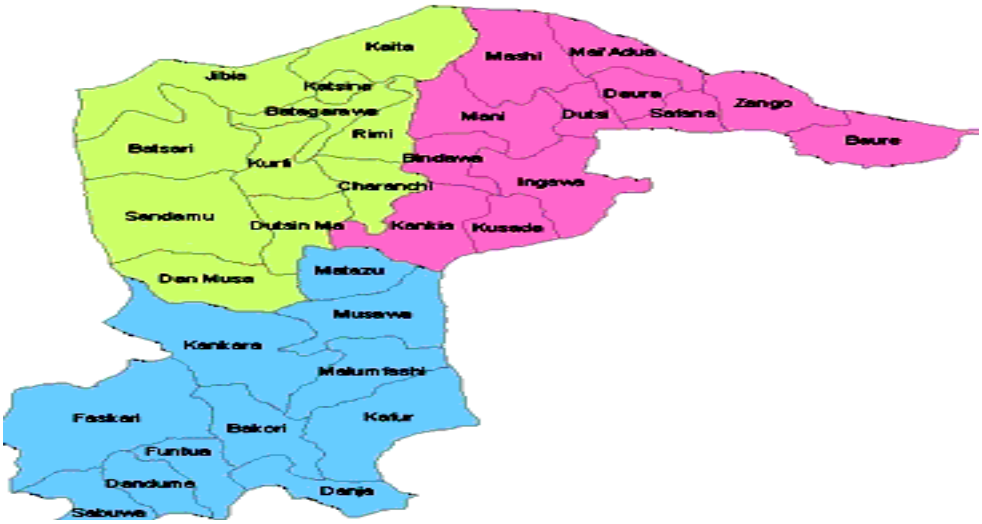

Fig. 1: Map of Katsina state

Sample preparations

Twenty block samples were collected from different Local Government of Katsina State; then were analyzed in Center for Energy Research and Training Ahmadu Bello University Zaria (CERT; A.B.U Zaria). These samples were air dried with mean temperature of 27 – 30 and mean relative humidity of about 70% for fourteen days (two weeks). The sample was ground into fine powder and pack to fill cylindrical plastic container. The samples were carefully weighed and 300 – 350g of each, then sealed (using vaseline, candle wax and masking tape) in a plastic container of uniform size (geometry of the sodium Iodide thallium [NaI (TI)] detector) for 90 days growth's period to ensure secular equilibrium between ^{238}U, ^{232}Th and their respective progenies. Vaseline was rubbed on the inner part of the cover of the plastic container in order to avoid the escape of the radon gas which is one of the daughter products of Uranium in the decay series.

Instrumentation and Calibration

The measurement was done using Gamma spectroscopy machine and the machine has higher Energy Efficiency. The calibration of gamma spectrometer was carried out using the International Atomic Energy Agency (IAEA) reference source material. The detector has higher efficiency to detect the quantity of radionuclides present in the samples. Before the counting commenced, the two gamma standard sources (^{137}Cs and ^{60}Co) the detector shield with lead shield to avoid background interference. The MAESTRO window was used with (MCA) Multichannel Analyser. The samples were then counted for 29,000 seconds. The gamma energies of 1.46, 1.7 and 2.62 MeV were used in the analysis of ^{40}K, ^{238}U and ^{232}Th, respectively.

Result and discussions:

Specific radioactivity

After the measurement the specific radioactivity concentration values of other Radionuclides also obtained that is: ^{226}Ra, ^{232}Th and^{40}K (C_{Ra},C_{Th} *and* C_K) this because not only **^{226}Ra**was found but other radionuclides also were obtained in measured samples and are presented in table 1. The activity concentration of the above mentioned radionuclides were measured in count per second (CPS) and then converted to Becquerel per kilogram (Bq/kg). As seen from the table 2, the activity concentration of potassium (C_K) ranges from 46.11±8.55 Bq/kg to 826.59 ± 4.82 Bq/kg. The activity concentration of Radium (C_{Ra}) ranges from 10.19 ± 2.43 Bq/kg to 75.09 ± 4.98 Bq/kg. The activity concentration of Thorium (C_{Th}) ranges from 2.77 ± 9.58 Bq/kg to

105.13 ± 1.25 Bq/kg. The highest value 826.59 ± 4.82 Bq/kg and lowest value 4.82 Bq/kg of activity concentration of ^{40}K were obtained in sample BS 06 and BS 05 respectively.

However our main concern is **^{226}Ra** which has the highest value 75.09 ± 4.98 Bq/kg and lowest value 10.19 ± 2.43Bq/kg of activity concentration of ^{226} Ra were obtained from sample BS06 and BS18 respectively. Though the presence of the other Radionuclides is very important and will help us to calculate the Radium Equivalent from the Measured samples. Using the following equation (1).

Table 1: Activity concentration of radionuclide in concrete block measured in CPS

S/N	SAMPLE ID	C_K (CPS)	C_{Ra} (CPS)	C_{Th} (CPS)
1	BS01	0.1856 ± 0.0053	0.0311 ± 0.0080	0.0922 ± 0.0084
2	BSO2	0.4968 ± 0.0027	0.0135 ± 0.0890	0.1070 ± 0.0087
3	BS03	0.1895 ± 0.0031	0.0257 ± 0.00329	0.1083 ± 0.0082
4	BS04	0.2328 ± 0.0006	0.0378 ± 0.0009	0.0874 ± 0.0067
5	BS05	0.5315 ± 0.0003	0.0230 ± 0.0010	0.0788 ± 0.0055
6	BS06	0.3173 ± 0.0047	0.0648 ± 0.0043	0.0450 ± 0.0037
7	BS07	0.3940 ± 0.0041	0.0088 ± 0.0210	0.0572 ± 0.0033
8	BS08	0.2478 ± 0.0015	0.0199 ± 0.0009	0.0712 ± 0.0044
9	BS09	0.2536 ± 0.0055	0.0168 ± 0.0010	0.0427 ± 0.0103
10	BS10	0.2623 ± 0.0025	0.0366 ± 0.0050	0.0571 ± 0.00220
11	BS11	0.2956 ± 0.0049	0.0184 ± 0.0008	0.0476 ± 0.00138
12	BS12	0.1884 ± 0.0028	0.0133 ± 0.0032	0.0352 ± 0.0015
13	BS13	0.2565 ± 0.0011	0.0098 ± 0.0011	0.0463 ± 0.00155
14	BS14	0.3453 ± 0.0048	0.0124 ± 0.0082	0.0392 ± 0.00255
15	BS15	0.1290 ± 0.0029	0.0169 ± 0.0030	0.0388 ± 0.0018
16	BS16	0.3997 ± 0.0041	0.0261 ± 0.0045	0.0551 ± 0.00230
17	BS17	0.4345 ± 0.0041	0.0158 ± 0.0070	0.0550 ± 0.00141
18	BS18	0.3886 ± 0.0055	0.0088 ± 0.0017	0.0036 ± 0.00160
19	BS19	0.2040 ± 0.0033	0.0306 ± 0.0060	0.0710 ± 0.0014
20	BS20	0.4856 ± 0.0034	0.0158 ± 0.0029	0.0271 ± 0.0271

Becquerel per kilogram (Bq/kg) =

Table 2: Activity concentration of radionuclide in concrete block converted to Bq/kg.

S/N	SAMPLE ID	C_K (Bq/kg)	C_{Ra} (Bq/kg)	C_{Th} (Bq/kg)
1	BS01	288.65 ± 8.25	36.04 ± 9.27	105.13 ± 9.85
2	BSO2	772.63 ± 4.19	15.64 ± 2.20	122.69 ± 9.92
3	BS03	294.71 ± 4.82	29.78 ± 3.81	123.49 ± 9.35
4	BS04	367.05 ± 0.93	43.81 ± 1.04	99.66 ± 7.64
5	BS05	826.59 ± 4.82	26.68 ± 1.66	89.85 ± 6.27
6	BS06	67.51 ± 7.30	75.09 ± 4.98	51.31 ± 4.22
7	BS07	97.18 ± 0.010	10.20 ± 2.43	65.22 ± 3.76
8	BS08	165.20 ± 2.33	23.06 ± 1.04	81.19 ± 5.01
9	BS09	46.11 ± 8.55	19.47 ± 1.15	48.69 ± 1.17
10	BS10	104.92 ± 3.89	42.41 ± 5.79	65.11 ± 2.51
11	BS11	60.23 ± 7.62	21.32 ± 0.92	54.28 ± 1.57
12	BS12	293.00 ± 4.35	15.41 ± 3.71	40.14 ± 1.71
13	BS13	233.18 ± 1.71	11.36 ± 1.27	52.79 ± 1.76
14	BS14	71.94 ± 7.46	13.37 ± 5.91	44.69 ± 2.91
15	BS15	200.59 ± 4.51	19.58 ± 3.48	44.24 ± 2.01
16	BS16	97.49 ± 6.37	30.24 ± 5.21	2.77 ± 1.25
17	BS17	81.98 ± 8.24	18.31 ± 0.81	62.71 ± 1.61
18	BS18	70.65 ± 8.55	10.19 ± 1.98	40.59 ± 1.85
19	BS19	317.26 ± 5.13	35.46 ± 6.95	80.96 ± 1.64
20	BS20	142.82 ± 5.29	18.31 ± 3.36	30.90 ± 1.76

Radium Equivalent Activity (Ra_{eq})

The distribution of natural radionuclides in the samples under investigation is not uniform. Therefore, a common radiological index has been introduced to evaluate the actual activity level of ^{226}Ra, ^{232}Th and ^{40}K in the samples and the radiation hazard associated with these radionuclides. (Ra_{eq}) can be calculated using the equation described by (Baretka *et al.*, 2005). The equation is stated in eqn. (1)

$$Ra_{eq} = C_{Ra} + 1.43C_{Th} + C_K \quad (1)$$

where C_{Ra}, C_{Th} and C_K are activity concentrations in Bq/kg of ^{40}K, ^{226}Ra and ^{232}Th restively The Ra_{eq} values calculated for the block sample and summarised in table 3,and is varied between 37.50 ± 4.0810 Bq/kg and 375.10 ± 12.0308 Bq/kg with a mean value 206.3 ± 8.055 Bq/kg as in table 3

Table 3: shows Radium Equivalent (Ra_{eq}) (Bq/kg)

S/N	Sample ID	Radium Equivalent (Ra_{eq}) (Bq/kg)
1	BS 01	208.60 ± 23.990
2	BS 02	250.58 ± 16.707
3	BS 03	229.00 ± 10.4016
4	BS 04	375.10 ± 12.0308
5	BS 05	218.80 ± 10.997
6	BS 06	154.07 ± 11546
7	BS 07	110.93 ± 8.0957
8	BS 08	151.88 ± 8.3840
9	BS 09	37.50 ± 4.0810
10	BS 10	143.60 ± 9.6788
11	BS 11	105.59 ± 3.50305
12	BS 12	95.37 ± 6.49025
13	BS 13	164.73 ± 3.9184
14	BS 14	83.82 ± 10.6457
15	BS 15	163.89 ± 7.4164
16	BS 16	41.71 ± 3.7467
17	BS 17	114.30 ± 5.7468
18	BS 18	73.68 ± 5.25385
19	BS 19	162.22 ± 5.2538
20	BS 20	73.49 ± 9.69021

Conclusion

The exposure to ionizing radiation that α ,β and radiation is indoor or out door . So it is important to evaluate the values of NORMs (^{226}Ra) in building materials because the half-life is 4.5billion years.From the result obtained in table 3 shows that the highest value obtained from Sample BS 04**(JIBIYA L.G.A)** which is **375.10 Bq/kg.** However, this value exceeded the limit recommended by Organization for Economic Development of Building Materials (OECD 1997) and UNSCEAR 2000, IAEA TecDOC. And ICRP, Baretka and Mathew (1985) , the value is 370 Bq/Kg which is recommended for safe use of building materials for dwelling.

Thus, this information is an important alert for the people to minimize the use of this building material in constructions of dwellings in this local government. Unfortunately this is an action that caused an environmental damage.

Since sampling covered at least more then half of the local government in Katsina state the result may be used for further reference.

Recommendations

The purpose of this investigation is to provide guidance for setting controls on the radioactivity of buildings materials.

1. This work confirms the radiation exposure and attributed risk could be reduced by careful choice of building materials during construction.
2. The proper choice of primary raw materials for the building products can regulate the indoor exposure of people.
3. Exposures from building materials are present every where; controls should be based on exposure levels of exposures.

4. The concentration of natural radionuclides in building materials vary significantly between states in Nigeria. Investigation may need to be under taken of activities in various building materials where such information is not available from earlier researches.
5. Member State should ensure that advice and assistance is available to producers or dealers, designer or builders, on methods of assessing doses to demonstrate compliance with radiological requirements.

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The use of computer-assisted Experimentation (CAEx) in Moroccan schools

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Abstract: The computer-assisted testing (CAEx) is a method of construction and operation of measures using the computer. It has an important use of CTI in experimental sciences field. The CAEx equipment includes a computer interface and associated with different sensors. It allows real-time measurement of various physical parameters changes, biological.
Our study is a collection of information on the types of sensors used in high schools, the appreciation of the type of teacher training teachers in the use of CAEx, measuring the level of use of this tool in experiences in class and possibly the benefits and advantages provided by this tool.
In this work, we made some experiments of CAEx tool. We did a survey on the use of CAEx which was to write a questionnaire that focused on equipping schools in CAEx, training of teachers CAEx, the frequency of use of this tool and its contribution to class.
We then distributed the questionnaire to teachers of physics in several Moroccan schools; This was a sample of 50.
It is clear from this survey that CAEx can:
- Gain time
- Present values and more accurate results
- Make less effort to achieve his goals

At first, we presented computer-aided experiments which we have reproduced in the laboratory.
In a second step, we checked the level of use of CAEx by teachers, and eventually enjoyed the benefits that bring them of CAEx.
Keywords: CAEx , physical experiments , physical-chemistry, school teachers-CAEx.

1. Introduction physical Chemistry

Within the scientific disciplines, greater emphasis is placed on experimentation. However, for this scientific experiment allows the understanding of complex concepts, it must be accompanied by presentations by the teacher. The integration of new computerized learning tools used to make these presentations interactive and meaningful for students, including [1] sciences.
The Experiment Computer Aided (CAEx) is an important area of use of ICT in the experimental sciences, it interact with a real experimentation through an interface provided with sensors and connected to a computer to collect the data, represent and analyze different [2] levels. The CAEx allows for experiences, to acquire and exploit measurements using the computer. The student is thus placed in a real lab environment allow it to design, plan and carry out experiments in physics, electronics, chemistry, biology, geology and technology [3]. Several acronyms and expressions are equivalent CAEx including: Beadle Robot Educational Robotics, ATIDEX for Acquisition and Computer Processing of experimental data, MBL for Microcomputer-Based Laboratory and CAEx for Computer-Assisted Experimentation [4]. The CAEx enables students to both configure and control a real experience, acquire data and display them in symbolic forms. [5] Thus, any CAEx system consists of the same elements: The Experiment Computer Aided (CAEx) is an important area of use of ICT in the experimental sciences, it interact with a real experimentation through an interface provided with sensors and connected to a computer to collect the data, represent and analyze different [2] levels. The CAEx allows for experiences, to acquire and exploit measurements using the computer. The student is thus placed in a real lab environment allow it to design, plan and carry out experiments in physics, electronics, chemistry, biology, geology and technology [3]. Several acronyms and expressions are equivalent CAEx including: Beadle Robot Educational Robotics, ATIDEX for Acquisition and Computer Processing of experimental data, MBL for Microcomputer-Based Laboratory and CAEx for Computer-Assisted Experimentation [4]. The CAEx enables students to both configure and control a real experience, acquire data and display them in symbolic forms. [5] Thus, any CAEx system consists of the same elements:

A sensor that measures the change of a physical quantity from a biological phenomenon and generates an analog electrical signal whose value is proportional to the measured parameter.
The electrical signal from the sensor is applied to an acquisition interface including an analog / digital converter. The interface converts analog signals into digital signals it sends to the computer.
A pilot adequate software interface and allows you to process measurements, including graphically.
All studies and experiences of countries that have adopted the CAEx showed that provides effective solutions for teaching physics. With CAEx, the tedious and repetitive taking action gives way to reflection on the use of these measures, the meaning and interpretation of the results. [6]
The CAEx because she still keeps in touch with reality, can develop an inductive thinking in students. It allows the student to pass a physical variable to the mathematical expression that represents it. For example, the student observes multiple shots of the same phenomenon data and graphs. Later, he tries to generalize his observations in the form of rules, laws, etc. [7].
The decision to implement the CAEx in Morocco's education was taken by the Department since 2009. In Morocco, the official programs of high school and college classes, invite to use these electronic resources that are now parts of the ICT program the Regional Centres for Careers Education and Training.
According to the decision of the government to equip the different high schools in CAEx equipment and to train teachers to be able to use it, we think of CAEx is dominant in Moroccan schools and becomes a regular tool for teachers. Indeed, in 2009, the Department has acquired 924 CAEx kits (SPC 513 for laboratory physics and 411 for those in the life sciences and earth). This corresponds to the massive acquisition of 14 Regional Academies of Education and Training. The effort was begun continued between 2010 and 2012. Currently, teaching equipment (CAEx and science education) remains a priority in Morocco. [8]
The CAEx is a modern educational tool to improve the level of learning among students and to facilitate the teacher's roles. However, some questions arise:
Is Moroccan schools are equipped CAEx? Does the CAEx is used by teachers? And what does the CAEx in the lesson physical sciences?
We propose in this work to identify various existing sensors in the accompanying high schools and their level of use by teachers, and possibly enjoy the benefits that brings them CAEx. To do this we have developed a paper questionnaire for teachers about the use of CAEx. We left the following assumptions:
-the most Moroccan high schools are equipped with hardware necessary for CAEx (range of sensors: voltage sensor, electric current sensor, pH sensor, motion sensor, magnetic field sensor, pressure sensor, meter sensor drop)
- The teachers were trained in the use of CAEx;
-The program experiences that address the CAEx are easily achievable, they do not take much time and they are effective;
-the use of CAEx by teachers in physics and chemistry experiments is almost universal.
To test these hypotheses, we have prepared a questionnaire for physics teachers from several schools.

2. Research Methodology:

First, we exposed the computer-assisted experiments we have reproduced in the laboratory.
Secondly, to test our hypotheses, we have prepared a questionnaire that focused on equipping schools in CAEx, teacher training CAEx, the frequency of use of this tool and its contribution in the classroom.
We distributed the questionnaire to physical science teachers 4 Moroccan schools, we also have distributed to trainers of teachers CRMEF physical science sections.
The number of distributed questionnaires was 100. We received 70 completed questionnaires and thus the number of abstentions was important. We then had to conduct interviews with professors of physics at the various accompanying high schools, in order to do our analysis.

3. Results and discussion:

The counting of the questionnaire is as follows:
-The Questions 1 to 3 on the age of teachers and the nature of the institution show that most teachers above 20 years of service, teachers of private schools have declined to answer the questionnaire.
-For Questions 4, 5 and 6: your institution be equipped CAEx material? And if so what are there that the sensors are?
Through the survey, we see that the surveyed establishments are equipped hardware 98% CAEx.
High schools considered are equipped with software logger pro Vernier LabQuest interface. Sensors found there are:
• voltage sensor
• electric current sensor
• pH sensor

• conductivity sensor
• pressure sensor
• the magnetic field sensor

The methods of measuring magnetic fields are quite numerous and there are several principles of magnetic sensors (which are very expensive), from the simplest of commonly used in industrial or consumer, to complex, often restricted to laboratories or very specific applications.

The need has been felt for the meter sensor drop or it can be replaced by a single dosing, but the motion sensor that works with the Doppler effect is actually missing and there is a problem.

In CRMEF, the software used is Latispro with the SySAM V6 interface and the following sensors:

• pH sensor
• conductivity sensor
• pressure sensor
• the magnetic field sensor
• temperature sensor

For Question 7: Have you received training in the use of CAEx?

The figure. 1 below shows the percentage of high school teachers trained in CAEx:

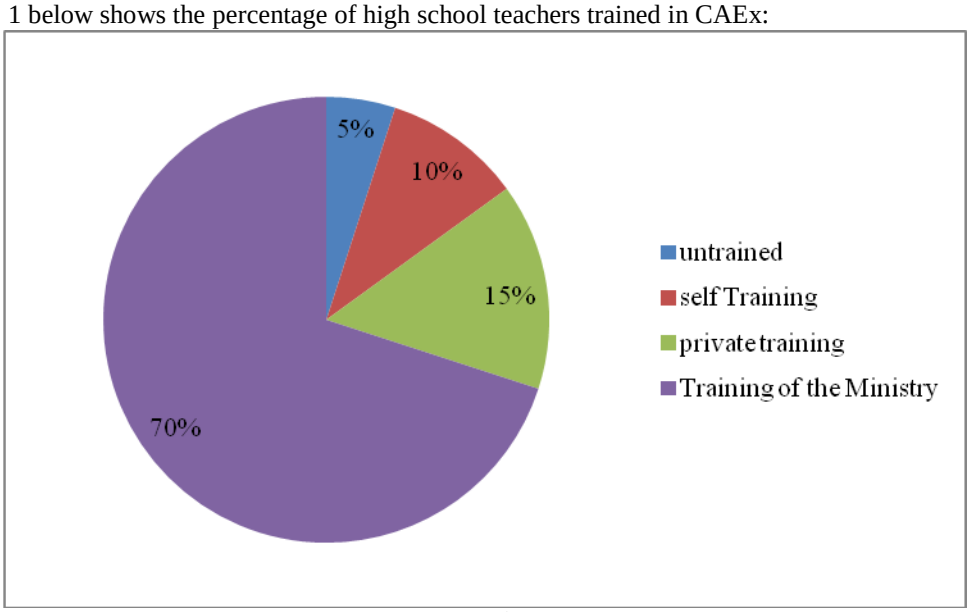

Figure 1 :Training of teachers CAEx

According to Figure.1, we note that 70% of teachers have received training from the Department, while only 5% had not received training in the use of CAEx.

For Question 8: Does the CAEx is used in the classroom?

The figure. 2 shows the percentages of teachers in our sample users and non users CAEx

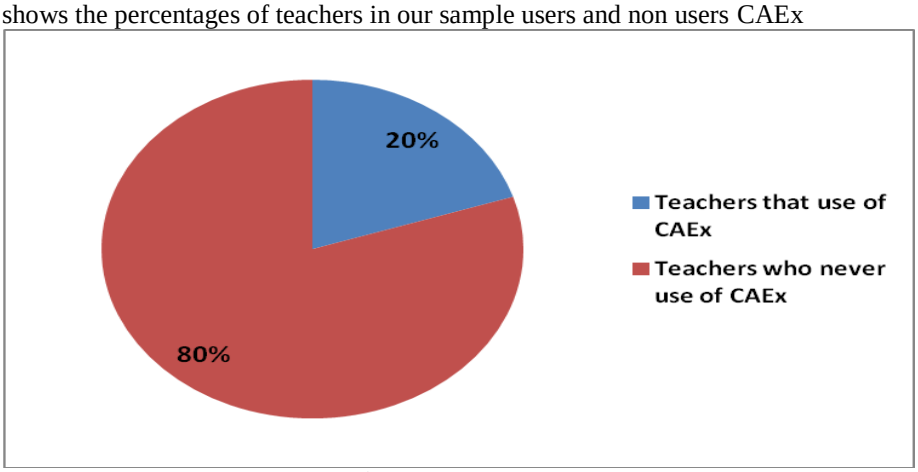

Figure 2: Percentages of teachers non-users and teachers users CAEx

Analysis of the results shows that teachers users CAEx class does not exceed 20% although all facilities are equipped CAEx.

For questions 9 and 10: What are the sensors used in the classroom and what experience are they used?

The interviewed teachers and questionnaires show that with the Logger Pro software and LabQuest interface compatible Varnier most popular sensors are sensors:

• voltage sensor
• electric current sensor
• pH sensor
• conductivity sensor
• pressure sensor

For question 11: What are the advantages of using the CAEx?

For that matter, it was necessary to choose between ten choices available:

the CAEx

1-allows saving time;
2-corrects representations of learners;
3-Strengthens group dynamics for learners;
4-Develop the scientific approach in learners;
5-help learners understand better and faster;
6-Provides more accurate values;
7-Participates in the development of learners' capacities in the field of ICT;
8-Allows the teacher to make less effort to achieve its objectives;
9-Helps to better assimilation of concepts among learners;
10-Contributes to a better acquisition among learners.

The figure.3 represents the percentages of previous choices

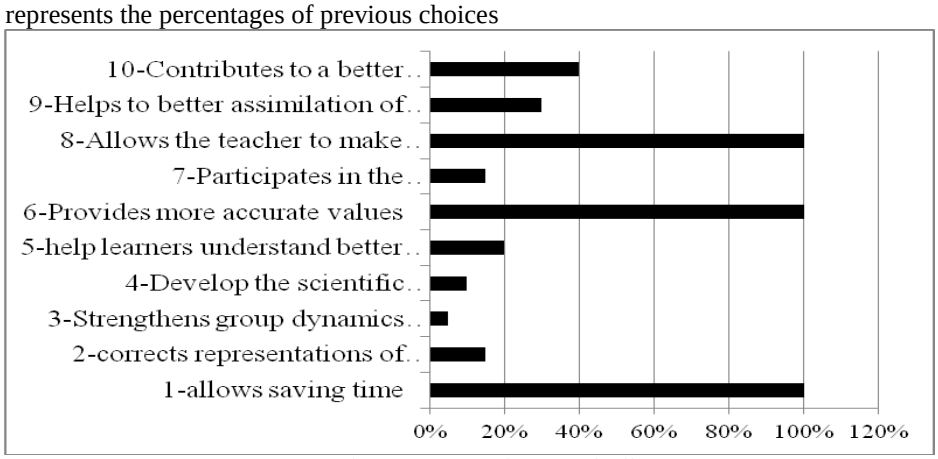

Figure.3: Percentages choices of the advantages of the use of different users CAEx teachers

For choice 1,6 and 8: The results showed that 100% of the teachers surveyed, claim that the main advantages of the use of CAEx are:

- CAEx allows saving time, indeed, CAEx processes the data and quickly turns the algebraic value to a digital value and draw the corresponding curves instantly. The teacher buys time allowing it to then interpret these curves. It can also save and then open the file again in class very quickly. The time saved can then be used later to interpret the results.
- CAEx the present values and more accurate results, eg pH measurement of a solution: the classic pH meter does not give exact measurements, unlike the pH meter sensor that allows us a calibration have more accurate measurements.
- The CAEx allows the teacher to make less effort to achieve its objectives, in fact, the teacher saves time because it is the software that processes the data and draw the curves which facilitates its work during the session courses.

For choice: the results show that with a too small percentage of the order of 5%, the CAEx does not contribute to group work because it is the teacher who makes the TP given that there is a single sensor for a given experiment, because the equipment is expensive.

For question 12: which do you prefer: classic experiment or experience with CAEx?

60% of respondents prefer computer-aided experimentation with classic experiment saw the benefits that the CAEx tool to the teacher;

For question 13: What are the advantages and disadvantages of using the CAEx this question was an open question to leave the choice to the teacher benefits or potential disadvantages?.

Among the advantages of the use of CAEx found in this issue, we identified:

-Gain time
- Provides more accurate results

-Allows The teacher to make less effort to achieve the purpose of the experiment
-Ability To study very fast phenomena
The disadvantages of the use of CAEx identified in our survey are:
- The students Does not develop the analytical skills and do not draw the graphs so it loses capacity with this new tool.
-The students do not face the measurement errors.

4. Conclusion:

We conducted a survey by questionnaire and interview with teachers of physics from several high schools and among the CRMEF trainee teachers.
The results of our survey show that the CAEx is a tool still little used in Moroccan schools. The reasons are for some a lack of training in this tool and for others a lack of time to perform the experiments. Despite the training and efforts by the Ministry, the objectives are still far from being realized. However, the student teachers are enthusiastic about using this tool in the sessions of teaching, we must give more attention to this new generation that can improve the level of education in Morocco, and seamlessly integrate technology in education.
Certainly the use of CAEx is convenient, but it also has disadvantages like any teaching tool. According to our survey, disadvantages are that the student does not handle and does not draw graphs itself. But these advantages are that it allows the teacher saves time later to interpret results and to make other experiences of CAEx has values and more accurate results and allows the teacher to less effort to achieve his goals, so there are advantages especially with proper use of the tool during the session.
We wish use of CAEx in class and to measure its contributions to students to see how it contributes to a better assimilation of concepts among learners.

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Motion of MHD Micropolar Fluid Toward a Stagnation Point Under the Influence of Induced Magnetic Field

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Abstract: A steady two-dimensional Magnetohydrodynamic (MHD) mixed convection stagnation point motion of an incompressible, viscous and electrically conducting micropolar fluid toward a stretching and or shrinking vertical surface with surface heat flux is investigated. The effects of induced magnetic field and the heat flux radiation are considered. The transformed differential equations are solved numerically by a finite-differencemethod. The results for skin friction, heat transfer and induced magnetic field coefficients are obtained. The velocity, micro-rotation and temperature distribution for various parameters are shown. The results are in good agreement with earlier studies. The present results are compared with existing results in the literature and shown to be in good conformity as shown in the resulting table and curves.
Key words: Micropolar fluid motion, Stagnation point, Stretching and Shrinking sheet,Induced magnetic field.

1. Introduction

Microrotation fluids theory has been studied by several authors as seen in literature.Eringen A.C. (1966), displays that the effects of local rotary inertia and couple stresses can explain the flow behavior due to the microscopic effects arising from the local structure and micromotions of the fluid elements in which the classical Newtonian fluids theory is inadequate. The behaviors of non-Newtonian fluids such as polymeric fluids, liquid crystals, paints, animal blood, colloidal fluids, ferro-liquids etc. can be described with the help of a mathematical model using this theory. Several researchers have investigated the theory and its applications such as Ariman T., Turk M.A. and Sylvester N.D., (1974), Lukaszewick (1999), Eringen A.C. (2001), Ishak A., Nazar R. and Pop I., (2007, 2008).

The stagnation point flow is important in many practical applications such as cooling of nuclear reactors, cooling of electronic devices, extrusion of plastic sheets, paper production, glass blowing, metal spinningand drawing plastic films and manyhydrodynamic processes. Laminar mixedconvection in two-dimensional stagnationflows around heated surfaces in the case ofarbitrary surface temperature and heat flux variations was examined by Ramachandran N., Chen T.S. and Armaly B.F., (1988). They established a reverse flow developed in the buoyancy opposing flow region and dual solutions are found to exist for a certain range of the buoyancy parameter. Devi C.D.S., Takhar H.S., andNath G.(1991) extended this work for unsteady case. Lok Y. Y., Amin N., CampeanD. and Pop I.,(2005) studied the case for a vertical surface immersed in a micropolar fluid. Chin K.E., Nazar R., Arifin N. andPop I.,(2007), Ling S.C., Nazar R. and Pop I., (2007) and Ishak A., Nazar R. and Pop I.,. (2007, 2008) reported the existence of dual solutions in the opposing flow case. The study of the boundary layer flow under the influence of a magnetic field with the induced magnetic field was considered by few authors. Raptis and Perdikis (1984) studied the MHD free convection boundary layer flow past an infinite vertical porous plate. Later, Kumari, M., Takhar, H.S., and Nath, G., (1990) considered prescribed wall temperature or heat flux, and Takhar, H.S., Kumari, M., and Nath, G., (1993) studied the time dependence of a free convection flow. Ali et al. (2011) discussed MHD mixed convection boundary layer flow under the effect of induced magnetic field. Hydromagnetic thermal boundary layer flow of a perfectly conducting fluid was observed by Das (2011). Mukhopadhyay S., Uddin S. and Layek G.C., (2012) discussed Lie group analysis of MHD boundary layer slip flow past a heated stretching sheet in presence of heat source/sink. Shit and Halder (2012) examined thermal radiation effects on MHD viscoelastic fluid flow over a stretching sheet with variable viscosity. Heat transfer effects on MHD viscous flow over a stretching sheet with prescribed surface heat flux was studied by Adhikari and Sanyal (2013). A steady MHD mixed convection stagnation point flow of an incompressible micropola fluid towards a stretching/shrinking vertical surface with prescribed surface heat flux was also studied by Adhidari (2013).

In this work, the motion ofa steady MHD micropolar fluid stagnation pointfor an incompressible fluid towards a stretching and/or shrinking vertical surface with surface radiation heat flux is studied. The effects of induced magnetic field and the heat flux radiation are taken into account to extend the work of Adhikari and other researchers in this field.

2. Mathematical Formulation for MHD flow Analysis

Consider a steady two-dimensional MHD flow of an incompressible electrically conducting micropolar fluid near the stagnation point on a vertical plate with prescribed surface heat flux with a velocity proportional to the distance from the fixed origin O of a stationary frame of reference (x,y), as shown in figure 1. A uniform induced magnetic field of strength H0 is assumed to be applied in the positive y-direction, normal to the vertical plate. The normal component of the induced magnetic field H2 vanishes when it reaches the wall and the parallel component H1 approaches the value of H0. It is assumed that the velocity of the flow external to the boundary layer $U = ax$ and the surface heat flux $qw = bx$ of the plate are proportional to the distance x from the stagnation point, where a, b are constants.

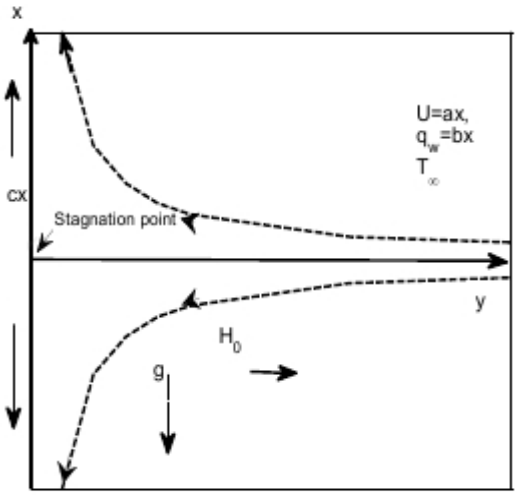

Fig 1: Sketch of the Problem

The magnetic Reynolds number of the flowis taken to be large enough so that theinduced magnetic field is not negligible.Under the Boussinesq and the boundary layer approximations the governing equations are given by

$$\frac{du}{dx} + \frac{dv}{dy} = 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$\frac{dH1}{dx} + \frac{dH2}{dy} = 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$\frac{Udu}{dx} + \frac{Vdu}{dy} = \frac{UdU}{dx} + \left(\frac{\mu+\kappa}{\rho}\right).\frac{d2u}{dy2} + \frac{\kappa}{\rho}.\frac{dN}{dy} + \frac{\mu}{\rho}.\left(\frac{H1dH1}{dx} + \frac{H2dH1}{dy}\right) - \frac{\mu}{\rho}.\frac{\hat{H}d\hat{H}}{dx} + g\beta(T - T\infty) \ldots (3)$$

$$\frac{udH1}{dx} + \frac{vdH1}{dy} - \frac{H1du}{dx} - \frac{H2du}{dy} = \frac{\alpha 1d2H1}{dy2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$\rho j\left(\frac{udN}{dx} + \frac{vdN}{dy}\right) = \frac{\gamma d2N}{dy2} - \kappa(2N + \frac{du}{dy}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$\frac{udT}{dx} + \frac{vdT}{dy} = \frac{\alpha d2T}{dy2} - \frac{1}{\rho Cp}.\frac{dqr}{dy} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Subject to the boundary conditions at y=0: $u=u_w(x) = cx$,

$v = vw\,(x)$, $N = -n\partial u/\partial y$,
$\partial T/\partial y = -qw/k$, $\partial H1/\partial y = H2 = 0$ …… (7)
$aty \to \infty$: $u \to ue\ x = ax$,
$N \to 0$, $T \to T\infty$,
$H1 = He\ x = H0ax/v$. …… (8)

where u and v are the velocity componentsalong the x and y-axis respectively, uw(x)the wall shrinking or stretching velocity(c>0 for stretching , c<0 for shrinking andc=0 for static wall), vw(x) the wall mass fluxvelocity, N is the microrotation or angular velocity whose direction of rotation is in thexy plane, μ is the dynamic viscosity, μ0 isthe magnetic permeability, ρ is the densityof the fluid, j is the micro-inertia per unitmass, i.e., micro-inertia density, γ is the spingradient viscosity, κ is the vortex viscosity

or micro-rotation viscosity, T is the fluidtemperature in the boundary layer, β is thethermalexpansioncoefficient, α is thethermal diffusivity, $\alpha 1$ is the magneticdiffusivity, k is he thermal conductivity, qwis the wall heat flux. Note that n is aconstant such that 0≤n≤1. When n=0 thenN=0 at the wall represents concentratedparticle flows in which the microelementsclose to the wall surface are unable to rotate.This case is also known as the strongconcentration of microelements. Whenn=1/2, we have the vanishing of anti-symmetricpart of the stress tensor anddenotes weak concentration ofmicroelements, the case n=1 is used for themodeling of turbulent boundary layer flows.We shall consider here both cases of n=0and n=1/2. Assume

$\gamma = \left(\square + \frac{\kappa}{2}\right) j = \square\left(1 + \frac{K}{2}\right) j, where\ K = \frac{\kappa}{\square}$,is the material parameter. This assumption is invoked to allow the field of equations that predicts the correct behavior in the limiting case when the microstructure effects become negligible and the total spin N reduces to the angular velocity [Ahmadi (1976), Yuce(1989)]. By using the Rosseland approximation the radiative heat flux qr in y-direction is given by [Brewster (1992)]:$qr = -(4\sigma s/3ke).(\partial\, T^4/\partial y)$,..... (9)

whereσs is the Stefan-Bolzmann constant and ke the mean absorption coefficient. It should be noted that by using Rosselandapproximation, the present study is limitedto optically thick fluids.Expanding T^4in a Taylor series about $T\infty$as:

$T^4 = T\infty^4 + 4T^3\infty(T - T\infty) + 6T^2\infty(T - T\infty)^2 + \cdots$.

Neglecting higher-order terms beyond the first degree in $T - T\infty$, we get

$T^4 \cong 4T^3\infty\, T - 3T^4\infty$, …….. (10)

In view of the equations (9) and (10), the equation (6) becomes

$\frac{udT}{dx} + \frac{vdT}{dy} = \frac{\alpha d\,2T}{dy\,2} + \frac{16\sigma s T^3\infty}{3ke\rho Cp} \cdot \frac{d2T}{dy\,2}$,…… (11)

Introduce a Stream function Ψ as follows u $= \partial\Psi/\partial$y, v $= -\partial\Psi/\partial$x. …….. (12)

The momentum, angular momentum and energy equations can be transformed into the corresponding ordinary differential equations by the following transformation:

$$\eta = \sqrt{\left(\frac{a}{v}\right) y}, \qquad f(\eta) = \frac{\psi}{x\sqrt{av}}, \qquad p(\eta) = \frac{N}{ax\sqrt{\frac{a}{v}}},$$

$\theta(\eta) = \frac{k(T - T\infty)}{qw} \cdot \sqrt{\frac{a}{v}}$, $H1 = Ho.\frac{ax}{v}.h'(\eta)$, $H2 = -Ho.\sqrt{\left(\frac{a}{v}\right) h(\eta)}$,……. (13)

Wherey the independent dimensionlesssimilarity variable. Thus u and v are givenby

$u = axf\,'\eta\,, v = -\,av\,f\,\eta$.

Substituting variables (13) into equations (2) to (6), we get the following ordinary differential equations:

1 + K f□ □ □+ ff□ □+ 1 − f□2 + Kp□ +M h□2 − h h□ □− 1 + $\lambda\theta = 0$,……(14)

α_2 h□ □ □+ f h□ □− h f□ □= 0, ... (15)

$\left(1 + \frac{\kappa}{2}\right) p'' + fp' - pf' - K(2p + f'') = 0$ ……. (16)

$\frac{1}{pr} \cdot \left(1 + \frac{4}{3F}\right) \theta'' + f\theta' - \theta f' = 0$ …… . (17)

subject to the boundary conditions (7) and (8) which become

$f\,0 = s, f\,'0 = e, p\,0 = -nf\,''0,\ \theta\,'0 = -1,\quad 0 = \quad ''0 = 0,$

$as\ \eta \to \infty: f\,'\eta \to 1, p\,\eta \to 0$

$\theta\,\eta \to 0,\quad '\eta \to 1.$ ..... (18)

Here f□ (η) p(η), h□ (η)and θ(η) give (dimensionless) the velocity, the angular velocity, the induced magnetic field and temperature respectively. In the aboveequations, primes denote differentiation with respect to η; $j = \nu/athe$ characteristic length [Rees &Bassom (1996)], Pr = ν/α the Prandtl number, $M = \mu\, e\, H0^2/\rho\, \nu^2$the magneticparameter or Hartmann number, $\alpha_2 = \alpha_1/\nu$ is the reciprocal of the magnetic Prandtlnumber, e=c/a the velocity ratio parameter, $S = \frac{vw(x)}{\sqrt{ax}}$.the constant mass flux with s>0 for suction and s<0 for injection,

$\lambda = \frac{Grx}{Rex5/2}$the Buoyancy or mixed convection parameter,$F = \frac{kek}{4\sigma sT^3\infty}$.

The radiation parameter, $Grx = \frac{g\beta(Tw - T\infty)x^3}{v2}$. The local Grashof number and $Rex = Ux/v$ is the local Reynolds number. Here λ is a constant and the negative and positive values of λ correspond to the opposing and assisting flows respectively. When λ=0, i.e., when

Tw=T∞ is for pure forced convection flow. Ramachandran N., Chen T.S. and Armaly B.F., (1988) considered the present problem with M=0 and K=0.

The skin friction coefficient Cf and the local Nusselt number Nux are defined as

$Cf = \frac{\tau w}{\rho U 2/2}$, $Nux = \frac{xqw}{k(Tw = T\infty)}$, …….. (19)

where the wall shear stress τw and the heat flux qw are given by

$\tau w = [(\mu + \kappa)/\partial y + \kappa N] = 0, \quad qw = -k[\partial T/\partial y]y = 0,$…… (20)

with k being the thermal conductivity. Usingthe similarity variables (10), we get

$1/2Cf\ Rex1/2 = [1 + (1 - n)/2]\ ´(0)\ ,Nu\ x/Rex1/2 = 1/\theta(0)$……. (21)

3. Numerical Solutions:

The equations (14) – (17) subject to the boundary conditions (18) are solved numerically using an implicit finite difference scheme known as the Keller-box method [Cebeci& Bradshaw (1988)]. The method has following four basic steps:

i) Reduce Equations (14)-(17) to first order equations;
ii) ii) Write the difference equations using central differences;
iii) Linearize the resulting algebraic equations by Newton's method and write them in Matrix-vector form;
iv) iv) Use the Block-tri-diagonal elimination technique to solve the linear system. The details are also described by Adhikariand Sanyal (2013).

Table1: Values of f//(0) and 1/ □(0) fordifferent values of Pr

(when λ=1, K=0, n=0.5, M=0, Δ η=0.02)

Pr	Bachok& Ishak(2009)	Bachok& Ishak(2009)	Adhikari and Sanyal (2013)	Adhikari and Sanyal (2013)	New result (for s=0,e=0, n=0)	New result (for s=0,e=0, n=0)
	f//(0)	1/θ (0)	f//(0)	1/θ (0)	f//(0)	1/θ (0)
0.7	1.8339	0.7776	1.8339	0.7776	1.8339	0.7776
1.0	1.7338	0.8781	1.7339	0.8781	1.7338	0.8780
7.0	1.4037	1.6913	1.4037	1.6913	1.4037	1.6913
10.0	1.3711	1.9067	1.3712	1.9072	1.3711	1.9071

4. Results & Discussion:

The step size Δη of η and the edge of the boundary layer η∞ had to be adjusted for different values of parameters to maintain accuracy within the interval 0≤η≤η∞ , where η∞ is the boundary layer thickness, the programme is run in MATLAB up to the desired level of accuracy. The validity of the numerical results have been compared with the results of Bachok and Ishak (2009), Adhikari and Sanyal (2013) and they are found to be in a very good agreement.

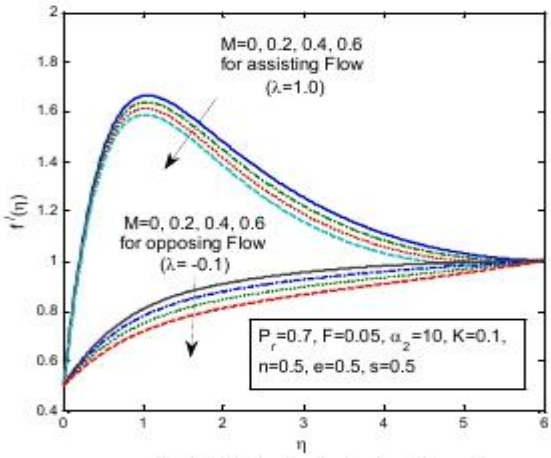

Fig.2. Velocity Distribution for different M in both assisting and opposing motions

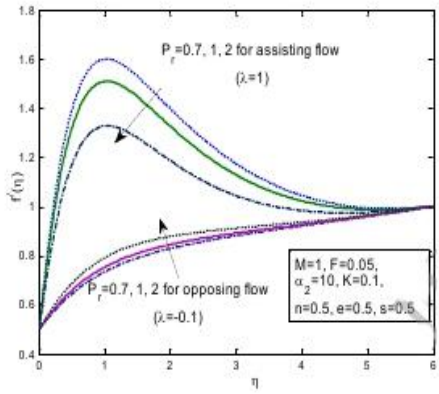

Fig.3. Velocity Distribution for different Pr in both assisting and opposing motions

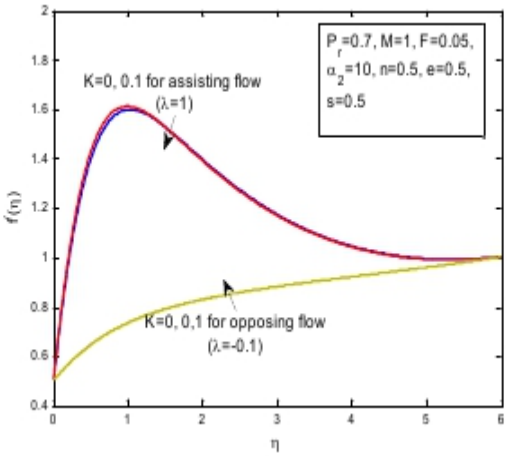

Fig.4. Velocity Distribution for different K in both assisting and opposing motions

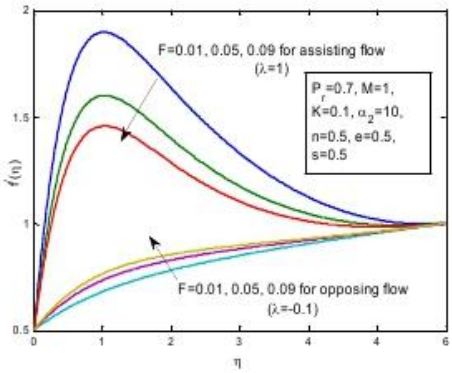

Fig.5. Velocity Distribution for different F in both assisting and opposing motions

The velocitydistribution for different M,Pr, K and F are shown in Figures 2 to 6. The induced magnetic field distribution for different parameters are shown in Figures 7,8 and 9 The Temperature distribution for different M, Pr, and K are also depicted in Figures 10, 11 and 12. The angular velocity distribution for different s parameter andthe Local Nusselt Number for different M were also investigated.

Figures 2 to 6 respectively depict that the velocity profiles for the assisting flowdecrease with the increase of M, Pr, K and F; whereas for the opposing flow the velocity profiles decrease with M, increase with Pr and F but almost no change with K. With the increase of s, Figure 6 describes that the velocity profiles for the assisting flow enhance near boundary and after η=1 it reduce, but for the opposing flow the velocity profiles increase. For both motions the velocity profiles raise with α2. Figures 7 to 9 illustrate that the induced magnetic field distribution for the assisting flow boost with M, Pr, K, F and s; but for the opposing flow it decrease with M, increase with Pr and s, almost no change with K and increase very slowly with F.

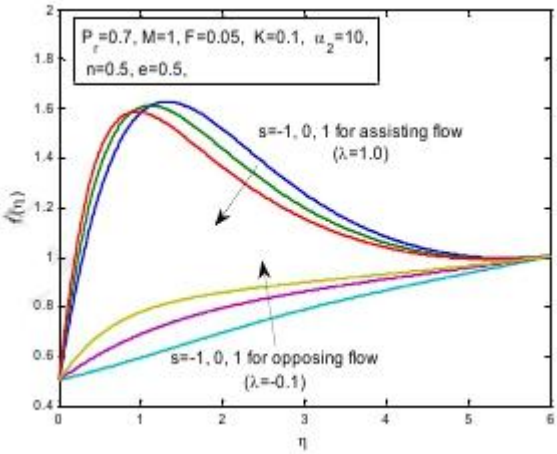

Fig.6. Velocity Distribution for different s parameter in both assisting and opposing motions

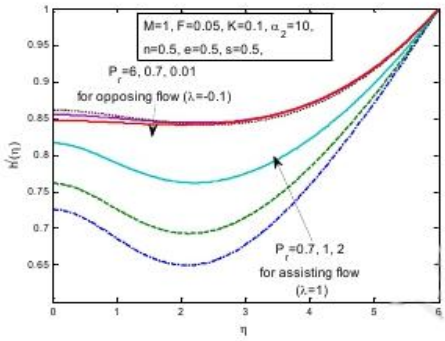

Fig.8. Induced Magnetic Field Distribution for different Pr in both assisting and opposing motions

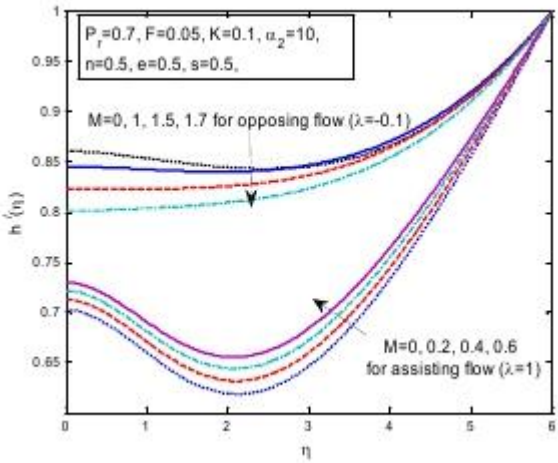

Fig.7. Induced MagneticField Distribution for different M in both assisting and opposing motions

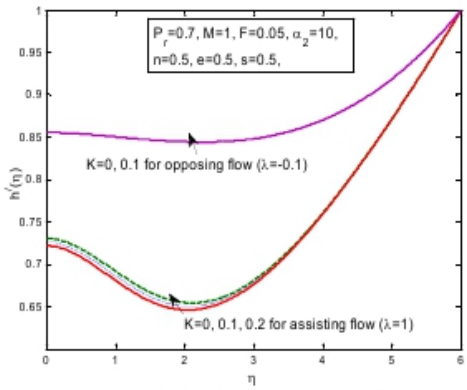

Fig.9. Induced MagneticField Distribution for different M in both assisting and opposing motions

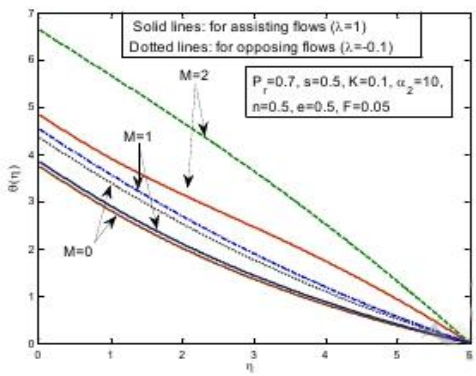

Fig.10. Temperature Distribution for different M in both assisting and opposing motions

Angular velocity profiles increase for both flows with s and M.
Temperature distribution for both flow motionsincrease with M (Fig 10), decrease with F and Pr(Figs.11 and 12). Investigations also revealed that the Skin friction coefficient and the local Nusselt Number decrease with M for the both flows.

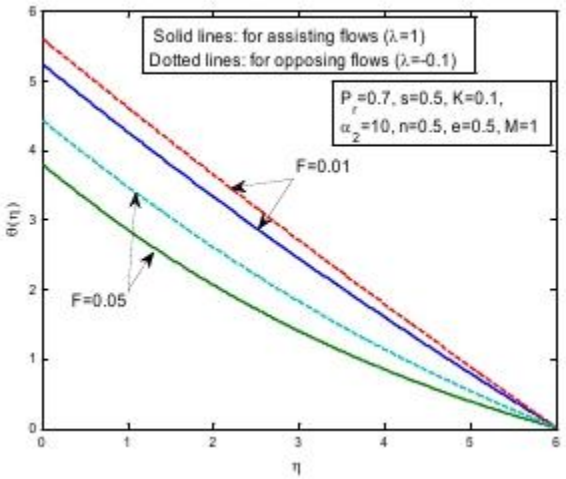

Fig.11. Temperature Distribution for different F in both assisting and opposing

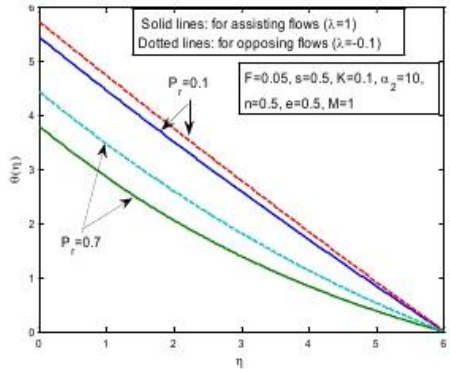

Fig.12. Temperature Distribution for different Pr in both assisting and opposing

Conclusion

The motion of a steady MHD micropolar fluid stagnation point for an incompressible fluid towards a stretching and/or shrinking vertical surface with surface radiation heat flux has been investigated. The effects of induced magnetic field and the heat flux radiation are taken into account. The results depict that the velocity profiles for the assisting flow decrease with the increase of all the parameters investigated while for the opposing motion the velocity profiles decrease with M, increase with Pr and F but almost no change with K. Temperature distribution for both assisting and opposing motions increase with M, decrease with F and Pr. The results are significant because they compare well with those existing in the literature.

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Evaluation of Response of OMF, CBF and EBF to Lateral Loads Using Nonlinear Pushover Analysis

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ABSTRACT: Nonlinear Pushover Analysis carried out for 15-Storey Steel Space frame having 4 bays of 4.5m each in X direction and 3 bays of 4.5 m each in Y direction located in Ahmedabad has been analyzed with ordinary moment frame, concentrically braced frame and eccentrically braced frame. All buildings are designed as per relevant BIS codes. XTRACT has been used for the developing Moment-Curvature (M-φ) relationship for beams, and also used for the developing Moment-Curvature (M-φ) & Axial load- biaxial moment (P-M-M) relationship for columns. These parameters are used for the nonlinear hinge properties. Nonlinear Pushover Analysis is carried on all these buildings and the results are compared for various framing systems.

INTRODUCTION:

Several systems can be adopted to provide adequate resistance to lateral forces. The most common systems are: moment frames, a combined systems of moment frames and shear walls, braced frames with horizontal diaphragms, and a combinations of the above systems. Moment frames may be economical for buildings with only up to 5 to 10 storeys. Shear wall and braced systems are economical up to 15 storeys. When frames and shear walls are combined, the system is called dual system. A moment frame, when provided with specified details for increasing the ductility and energy absorbing capacity of its component, is called a *special moment frame*; otherwise it is called an *ordinary moment frame*. Braced frames provide resistance to lateral forces acting on a structure. The members of a braced frame act as a truss system and are subjected primarily to axial stress. Depending on the diagonal force, length, required stiffness, and clearances, the diagonal members can be made of double angles, channels, tees, tubes, or even wide flange shapes. Besides performance, the shape of the diagonal is often based on connection considerations. The braces are often placed around service cores and elevators, where frame diagonals may be enclosed within permanent walls. The braces can also be joined to form a closed or partially closed three-dimensional cell so that torsional loads can be resisted effectively. A height-to-width ratio of 8-10 is considered to form a reasonably effective bracing system. Braces may be grouped into concentrically braced frames (CBFs), and eccentrically braced frames (EBFs), depending on their ductility characteristics.

NONLINEAR STATIC ANALYSIS:

In performance based design response of structure is considered beyond elastic limit as opposed to code based approach. Static non-linear analysis is one of the analysis technique used for performance based design. Pushover or capacity based analysis is more popular as a static nonlinear analysis. Two types of pushover analysis are as:

Force Controlled used when load is known and structure is desired to support this load. For gravity load on structure force controlled, push over analysis is used.

Displacement Controlled used when load is unknown but displacement is known and structure is desired to lose their strength and become unstable. For lateral load on structure displacement controlled, pushover analysis is used.

Three main steps involved in this analysis procedure.

- Evaluation of Capacity of building i.e. Representation of the structure's ability to resist a force.
- Evaluation of Demand curve i.e. Representation of earthquake ground motion.
- Determination of Performance point i.e. Intersection point of demand curve and capacity curve.

PROBLEM:

In this paper, a 15 - storey building, having regular plan geometry is considered for analysis. This building is analyzed for three different framing systems and located in Ahmedabad. The plan of the building is shown in Figure 1 and bracing orientation is shown in Figure 2.

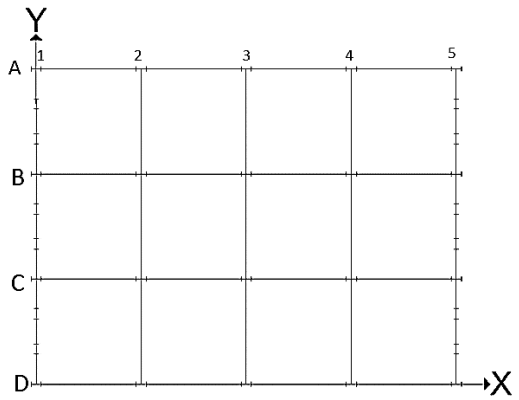


Figure 1: Plan of Building

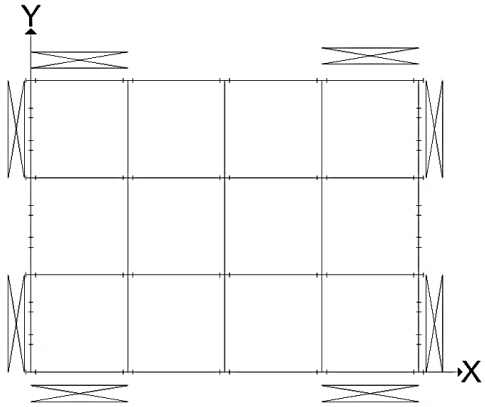


Figure 2: Bracing Orientation

Building Data	Loading Data
Building Size :18m X 13.5m	
Typical storey height :3.5m	**Dead Load**
Frame material except slab :Structural steel	Due to outer infill walls: 10 kN/m
Seismic Zone/City :III / Ahmedabad	Due to Slab self-weight: 1.75 kN/m2
Typical Floor Detail :70 mm thick Precast slab	Floor Finish: 1 kN/m2
Young's Modulus E (all members) :2.0x105 N/mm2	
Density of Steel :78.5 kN/m3	**Live Load**
Poisson's Ratio :0.3	All floors except top most floor: 3 kN/m2
Yield Strength of Steel (all members) :250 N/mm2	Top most floor: 1.5 kN/m2

Seismic Loading	Wind Loading
Seismic Zone (Z): III	Basic Wind Speed: 39 m/s
Soil type: II	Life Period: 50 Years
Importance Factor: 1	Terrain Category:
Damping: 2%	Terrain Class:
Response Reduction Factor : 5 for EBF	Topography Factor: 1
: 4 for OMF and CBF	

Loading Combination

1) Limit State of Strength

1) 1.5 DL + 1.5 LL
2) 1.2 DL + 1.2 LL ± 0.6 EQ/WL
3) 1.2 DL + 1.2 LL ± 1.2 EQ/WL
4) 0.9 DL ± 1.5 EQ

2) Limit State of Serviceability

1) DL + LL
2) DL + 0.8LL ± 0.8EQ
3) DL ± EQ

Member Properties for Structures with 15-Storey

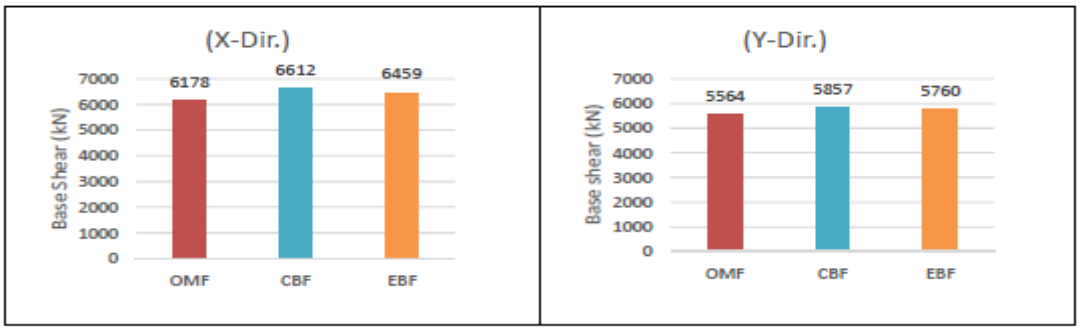
Specification	OMF	CBF	EBF
Columns (A1 to D1, A5 to D5)	UC 305 305 240 (13 to 15) BU UC 305 305 240 + 2PLT 350 X 16 (10 to 12) BU UC 305 305 240 + 2PLT 400 X 18 (7 to 9) BU UC 305 305 240 + 2PLT 450 X 20 (4 to 6) BU UC 305 305 240 + 2PLT 500 X 25 (1 to 3)	UC 305 305 158 (13 to 15) UC 305 305 198 (10 to 12) BU UC 305 305 198 + 2PLT 350 X 16 (7 to 9) BU UC 305 305 198+ 2PLT 400 X 20 (4 to 6) BU UC 305 305 198 + 2PLT 450 X 25 (1 to 3)	
Columns	UC 305 305 283 (13 to 15) BU UC 305 305 283 + 2PLT 350 X16 (10 to 12) BU UC 305 305 283 + 2PLT 400 X 18 (7 to 9) BU UC 305 305 283 + 2PLT 450 X 20 (4 to 6) BU UC 305 305 283 + 2PLT 500 X 25 (1 to 3)	UC 305 305 240 (13 to 15) BU UC 305 305 240 + 2PLT 350 X 16 (10 to 12) BU UC 305 305 240 + 2PLT 400 X 18 (7 to 9) BU UC 305 305 240 + 2PLT 450 X 20 (4 to 6) BU UC 305 305 240 + 2PLT 500 X 25 (1 to 3)	
Beam (1 To 6)	ISMB 600	ISMB 500	
Beam (A To D)	ISMB 600	ISMB 500	
Secondary Beams	ISMB 200	ISMB 200	
Braces	NA	ISA 200 X 200 X 15	

BU = Built-up Section & UC = Universal Column

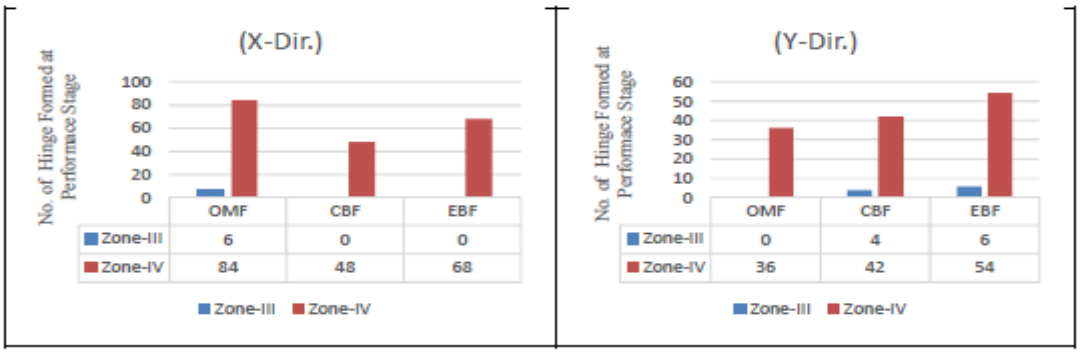
ANALYSIS RESULTS:

Models of structure are analyzed in SAP2000v16 for given data, and analysis results are compared for different parameter. OMF, CBF and EBF are checked for displacement and drift for seismic Zone - III and wind forces. In frames where no/low plastic hinge formation takes place in Zone – III are checked for performance in Zone – IV.

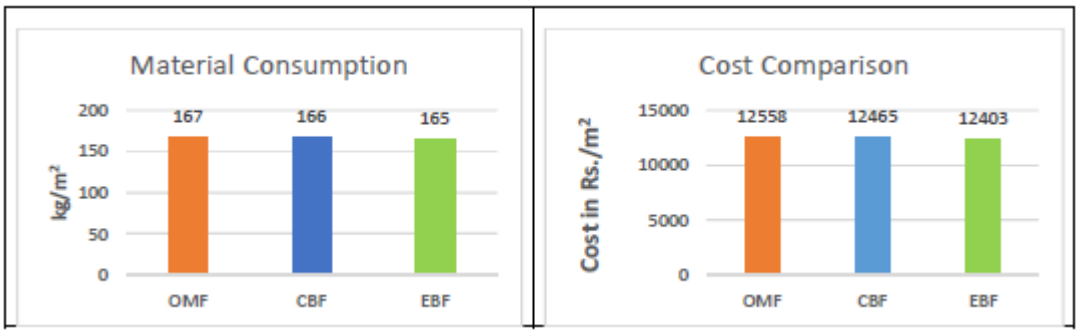
Base Shear at Performance Stage:



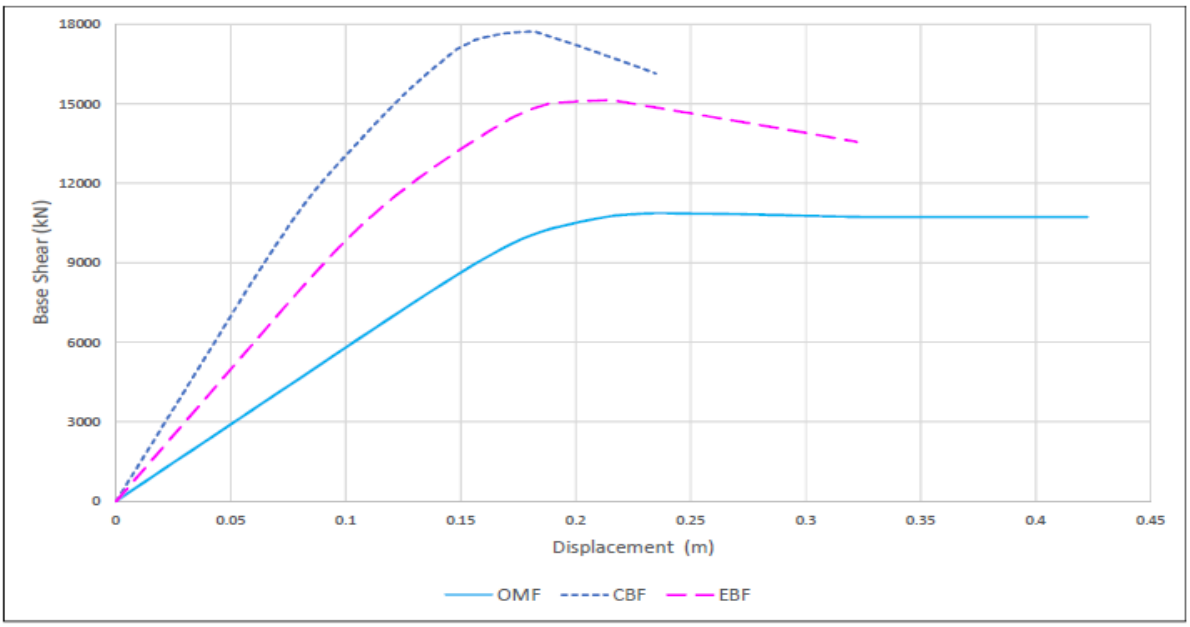
Number of Hinge formed at Performance Stage:



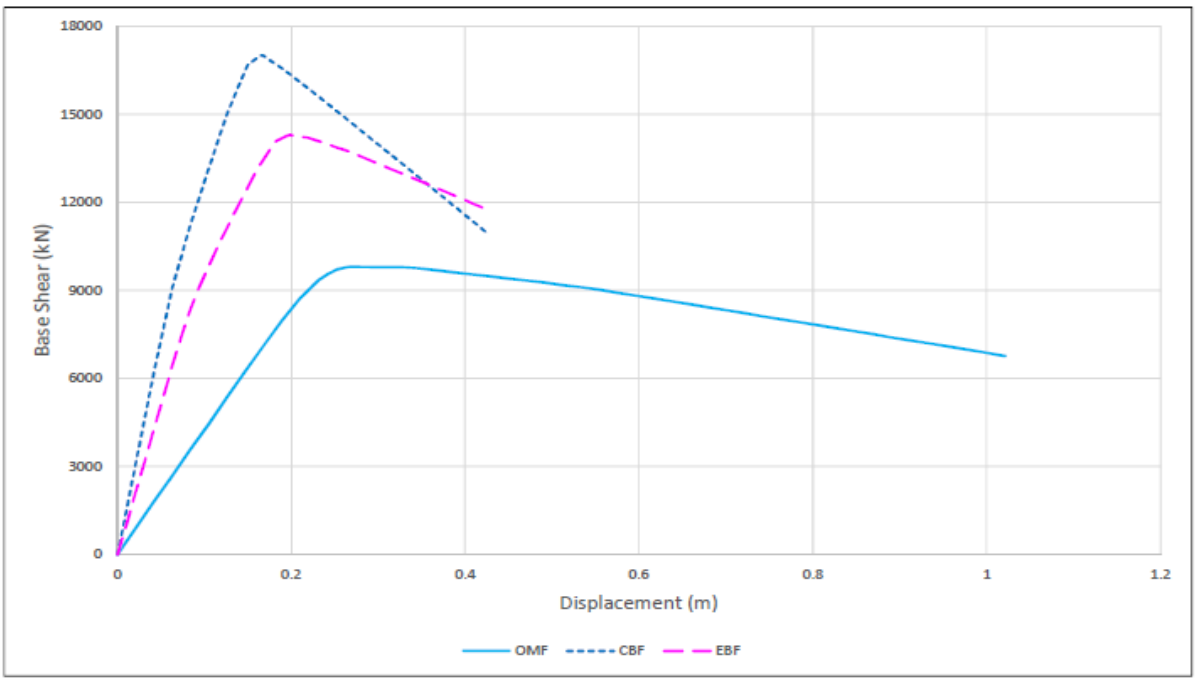
Material Consumption and Cost Comparison:



Capacity Curve for Pushover Analysis (X-Dir.)



Capacity Curve for Pushover Analysis (Y-Dir.)



Conclusion:

1) Concentrically braced frame (CBF) structures are considerably stiffer as compared to Ordinary moment frame (OMF) and Eccentrically braced frame (EBF), So Concentrically braced frame (CBF) attract higher seismic forces.
2) The buildings considered in the present work are designed for the Zone-III and Wind forces for Basic Wind Speed. As seen from Nonlinear Pushover Analysis all the frames i.e. Ordinary moment frame (OMF), Concentrically braced frame (CBF) and Eccentrically braced frame (EBF) meet the demand imposed on them for different stories considered. These buildings with various framing systems are further checked for compliance in Seismic Zone-IV and are found safe for the demand imposed on them.
3) As seen from Capacity Curves from different framing systems used, the behaviour of Eccentrically braced frame (EBF) lies between the behaviour of Ordinary moment frame (OMF) and Concentrically braced frame (CBF). Hence it can be concluded that Eccentrically braced frame (EBF) meets both Strength and Stiffness criteria along with increased ductility.
4) Presently available Hot-rolled sections are weak in one direction and need strengthening along that directions. It could be better to use Symmetrical Sections.
5) wt./m2 and cost/m2 are almost same for Concentrically braced frame (CBF) & Eccentrically braced frame (EBF). Eccentrically braced frame (EBF) should be preferred as it is more ductile.

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