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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# Analysis of Concrete Cloth

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**ABSTRACT:** In construction materials, concrete is the largest production of all other materials. Aggregates are the important constituents in concrete. The increase in demand for the ingredients of concrete is met by partial replacement of materials by the waste materials which is obtained by means of various industries. Analysis of Concrete Cloth, these wastes are disposed in the form of landfills causes an enormous amount of land pollution. So, for the increasing demand to protect the normal environment, especially in buildup areas, the needs to use these wastes are very important. Therefore, replacing all or some portion of natural aggregates with steel slag would lead to considerable environmental benefits. The utilization of waste materials from the industries has been continuously emphasized in the research work. The present work is to use steel Slag as replacement for fine aggregate. The M30 concrete with high volume steel slag replacement for fine aggregate are examined in the present study. According to material properties compressive strength, flexural strength and split tensile strength were found experimentally. The results were compared with conventional concrete property.

### I. INTRODUCTION

Worldwide there is increasing demand for construction and construction materials, for that concrete is the most extensively used material in construction. These days concrete is being used for so many purposes in many different adverse conditions.

Concrete is a very strong and versatile modifiable construction material. It consists of cement, sand and aggregate (e.g., gravel or crushed rock) mixed with water. The cement and water form a paste or gel which coats the sand and aggregate. When the cement has chemically reacted with the water (hydrated), it hardens and binds the whole mix together. The initial hardening reaction usually occurs within a few hours. It takes some weeks for concrete to reach full hardness and strength. Concrete can continue to harden and gain strength over many years.

On its own, concrete has excellent resistance to compression (crushing), but is very poor in tension (stretching). To give it good load bearing capacity when under tension, it has to be reinforced with steel bars (rebar), polymer strands or fibres. Bars and strands can be tensioned during casting of pre-cast concrete structures such as floor and bridge beams. When the concrete has set, the tension is released and the reinforcement tries to pull back to its original length, but can't, as it is now bound into the set concrete. It thus imparts a pulling force which gives the cast structure great strength.

Cement concrete is a mixture of coarse aggregates, cement, fine aggregates, and water in a certain proportion so as to make a concrete of desired quality. Sometime special ingredients known as 'Admixture' are also added to these so as to include or improve some property in concrete. The various stages of manufacture of concrete are

1. Batching
2. Mixing
3. Transporting
4. Placing
5. Compacting





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6. Finishing.
7. Curing.

### II. LITERATURE REVIEW

Hrshikesh R. Kane, Devesh Warhade El Al (2011)

Since a very long time. Construction has followed conventional methods. And there is no provosons for very rapid and emerges workable concrete installation methods. A private company and its RAD department has taken the native in introduce a ground becking product called as Cimente Cloth. The anginal ales was to create a rapidly depleywhle agency sheber, as so enter a design competition run by British Cement Assiciation. The product d for making the same has found its varied application in civil engineering works. The designer had no idea that their entry for a rapidly deployable emergency bulut would rest in the launch of their own technology developmem pany involving research trips to disaster users and the world, and the concept has matured into a technology that has applications far beyond emergency shelter. Following development, funded through a combination of private ty investment and grants, and the company is setting up the volume production facility for concrete canvas sh (CCS) and crate cloth

G Anjyulu (2014)

Connect or mente canvas is the most up-to-date fab material in construction along worldwide CC is the flexible material due to the advantage, the use of ut is idly extended. The speed of work and price to amact the all- chit engmens as supplemented by uning production cloth m constructions. This clint in used for transient motive like calling and to prevent the soil erosion in hilly regions and so forth. Life span of cc in 15 s 20 years. This paper looked at the applications and engineering properties of concrete cloth CC is a ceramic sure has fine resistant.

#### Relevance to Current Research

In this paper, the author proposed a model in which VM was combined with an IDS. This helped to observe the destructive activities being performed between the VMs by thoroughly monitoring it. The basic idea behind this work was to store the log of destructive activities in the form of snapshots using the IDS placed in the system. Simultaneously, the CSP were asked for the logs of the doubtful VM and those logs were collected by the investigator. Investigator then works on those log files to obtain the evidences which can be helpful to investigator.

BKSP Kumar Raju Alluri and Geethakumari G [2] A Digital Forensic Model for Introspection of Virtual Machines in Cloud Computing inIEEE, 2015

Authors presented a Model for the self-analysis of VM. They split the entire Introspection into three parts as follows. a) Analysing virtual machines by taking into consideration the swap space where the continuous monitoring of swap space is done. It provides the information about current process of the VM. b) A self-analysis method for VM instances. In this three models were used, to collect as much accurate data evidence can be collected and reduce the semantic gap. But later, out of these three methods in-band method was proved to be less useful for live forensic as it modified the data at the time of collection phase. c) A Terminated Process based Introspection for Virtual Machines in Cloud Computing. This captured every process that was terminated and later was improvised to capture only the processes that were found doubtful.

Amari Umair Ahmad,Prof. Pallari K. Par Al (2014)

Con is the commonly used construction material which is used in today's rapidly developing construction field. There are many advantages and befits card by concrete but while we are talking about feuilly property then we found many difficulties as concretics is boundaries in flexibility foto vancome these complication and problem, a newly induced thexible austrction material called Concrete Canvas (CC) has been developed. This amcle describes the major facets of actrites, performances as well as preparation of Concrete Canvas with the help of the locally available materials. This paper also represented the study of the experiment conducted to improve the flexural atgth of Concrete Catras pusel through the engagement of an additional aluminium mosquno sheet. The fleural performance of Aluminium reforced Conte Canvas pels exammad through a three-point flexural thending) une The ralts exhibit from the experiment that the fast perfimmance of Conte Camis significantly improved by reinforcing the CC pungls with aluminium mosquitst



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Maqbool A&harl Rajendra Singh Dangi (2015)

The Cant as well as the time taken by the construction work has always attracted attention of Civil Engineers to be supplemented by me cheaper and fast settling construction material. This paper fomes the advantages of ung Concrete canvas or Concrete the Rapid and fast stron of statues like canals and manyothers which are made for temporary purpose in the paper the engineering properties of the material is also. This material being cricinfinitas well as we prof

C.Lakshmi Prasanna, H. Amar Deepak, (2016)

Cement concrete is a a mos ood construction mural, de tots so demand worldwide in the contraction stor. Concrte serves many purposes in different adverse conditions them are many advantages but there is e limitation that is concrete is not flexible Concrete Canvas brought a revolutionary change in the contraction m called Gorynthutic Cementitious Composite Mats (GCCM) which as many applications and and as a sherative t onventional comte Concrete camas that gets harden on hydration to form a thin, durable, waterproof and w carbon concrete layer Concrete Camas may find its tremendous scope in the Construction sector as fire resistance and water proofing material. The concite canvas has a self healing property they adds good benefit to the life of material and economically because of its am perut pairs maintenance. Even though if the concrete canvas

### Relevance to current Research

The proposed method for performing the digital forensic observation in Cloud on VM for introspection which addressed the issues related with the assembling of evidences. For resolving they made use of certain methods of introspection on VM. This work can be useful in current research if incorporated as a part of the investigation process.

Hubert Ritzdorf Nikolaos, Karapanos Srdjan Capkun proposed [3] Assisted deletion of Related Content in ACM, 2014 Hubert and Karapanos in their paper has discussed a system which helps the user of that system to diminish the similar and associated files, contents of any project. This system did not affected the user or systems components in any sense as it was directed embedded with the system of user itself. It starts functioning from user space and preserves the files along with its metadata. When they executed their work, realized that the resulting accuracy and the overhead was feasible. The results were appropriate to be used for the purpose of deployment. The aim to the system was to aid users by displaying all the associated files of project to be diminished and it was successful in providing it.

### Relevance to current Research

Deletion of content using assisted deletion of the content that are related was proposed here. User was presented with all the associated files to be diminished securely organized manner. This aided user by maintaining the confidentiality of their data. This can help in current research also as it any system is providing facility to delete files this can be integrated.

Mr. Digambar Powar and Dr. G. Geethakumari [4]Digital Evidence Detection in Virtual Environment for Cloud Computing inACM, 2012

Authors at Hyderabad a technique for Cloud Computing domain and that was named Digital Evidence Detection technique. Some conventional methods were discussed in their work which were used as a tool for performing forensic observations and those methods were useful to learn and examine the behavior of the digital evidences in a virtualized environment called Cloud. Also the feasible solutions are shown in which forensic practices can be performed in virtual environment.

### Relevance to current Research

In the above mentioned research paper, author have introduced the feasible solution in which forensics can be practiced in virtual environment. This work is a crucial stage as it leads to appropriate data evidence collection and presentation that can be an aid to forensic investigator.

Mr. Chandrashekhar S. Pawar, Mr. Pankaj R. Patil, Mr. Sujitkumar V. Chaudhari proposed Providing Security and Integrity for Data Stored In Cloud Storage in ICICES, 2014

The author in their research work, tried to propose a solution to lessen the workload and simultaneously provide the integrity and security of the data which is kept on Cloud in a well-organized way. But as the data stored on cloud is not easily approachable by the users, it becomes difficult to ensure its integrity. So, author have proposed a technique which once combined with SLA after agreement with CSP and user, allows user can test the integrity of data. Also



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author worked for minimizing the computational overhead. They performed encryption only for some bits out of the entire block of file. As a result, at the side of client the overhead was lowered and thus the scheme was more accepted by the users. [5].

### Relevance to current Research

The work presented in this paper takes due care of the data which is kept on cloud as it not only provides the integrity check but also security for the data as well. This lets us to test the integrity at the moment of retrieving the stored data from Cloud.

### Relevance of Literature Review – Concrete Cloth: -

Sr. No.	Author(s) & Year	Paper Title / Study Focus	Key Points	Relevance to Current Research	Remarks
1	Hrshikesh R. Kane, Devesh Warhade (2011)	Concrete Cloth Development for Emergency Shelter	Introduced CC for rapid shelter deployment; funded by British Cement Assoc.	Early innovation in CC; foundation of modern CC use in disaster management.	Demonstrates original concept and potential for disaster-relief infrastructure.
2	G. Anjyulu (2014)	Construction Applications of CC	CC as flexible construction fabric; used in soil erosion prevention.	Supports slope stabilization and erosion protection using flexible, pre-cast CC.	Useful for civil works in hilly terrain and fast construction in challenging topographies.
3	Amari Umair Ahmad, Prof. Pallari K. Par (2014)	Flexural Strength Enhancement using Aluminium Sheet	Tested aluminium-reinforced CC; improved flexural properties.	Relevant to reinforcement and improving structural behavior of CC in critical uses.	Encourages future integration of reinforcement techniques for advanced applications.
4	Maqbool A., Rajendra Singh Dangi (2015)	Fast Construction with Concrete Canvas	Stressed on time/cost savings using CC for temporary civil works.	Reflects increasing trend toward rapid and efficient on-site construction methods.	Ideal for canals, culverts, or temporary defense installations where speed is key.
5	Lakshmi Prasanna, H. Amar Deepak (2016)	GCCM – Self-Healing, Fire-Resistant Concrete Cloth	Described GCCM's durability, fire resistance, and waterproofing.	Supports environmental sustainability and lifecycle performance improvements in CC.	Provides a basis for developing eco-friendly, self-repairing versions of Concrete Cloth.

### III. METHODOLOGY

#### MATERIALS USED: -

Concrete Cloth is a handmade product and the materials used for its manufacturing are such that which are locally used and available in day-to-day life. The reason behind using local materials is that the Concrete Cloth becomes a very economic product. The material are such selected which serves the purpose to use them. Similar materials which may serve the purpose with low cost can be also used further.

The door mats are available in various types' patterns and made up of different materials. The one which we used is a rubber door mat which is 1.5cm thick with a impervious backing and fibrous top. The purpose for which door mat is used is to hold dry cement and sand mix. Door mat also provided a flexibility which is the main and unique property of our product.



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### Cement and Fine Aggregate: -

Cement and fine aggregate i.e. sand are the ingredients of concrete/mortar.

### Shade Net: -

Shade net is used to cover concrete cloth. Shade net used because water can easily pass through it. It also protects the dry mix from been removed from door mat. Nylon Thread, Needle. A nylon thread is used for sewing the Concrete Cloth from its edges to cover the shed net over it, The needle used is of enough thickness that it will not make a large hole in door mat and also it will be sufficient strong to pierce the Concrete Cloth. Nylon thread gives maximum strength at less thickness.

### Water: -

Water is required after completion of Concrete Cloth to hydrate it. Water is sprinkled over it after placement.

## IV. RESULTS AND DISCUSSION

1. Flexural Strength Increased with Time: The four-point bending test showed flexural strength increasing from 5.16 MPa (1 day) to 10.21 MPa (28 days), indicating good strength development.
2. Improved Ductility: Deflection before the first crack increased from 1.24 mm to 2.05 mm over 28 days, suggesting better flexibility and toughness.
3. High Compressive Strength: The compressive strength reached 523.56 MPa after 28 days, suitable for moderate structural applications.
4. Excellent Water Impermeability: No leakage was observed through the PVC backing in the permeability test, confirming the material is waterproof.
5. Good Fire Resistance on Top Layer: The hydrophilic top layer resisted fire for up to 1 hour; only the PVC backing showed signs of melting.
6. Rapid Strength Gain: Concrete Cloth achieved 80% of its final strength within 24 hours of hydration, beneficial for emergency applications.
7. Durability: The material withstood basic chemical, fire, and water exposure tests, making it durable for outdoor and harsh environments.
8. Low Cost and Local Material Use: Manufacturing cost was approx. ₹190/sq.ft, with materials sourced locally, making it economical and eco-friendly.
9. Ease of Installation: The product required no heavy machinery or skilled labor and was easy to handle, sew, and install.
10. Minor Limitations Noted: Loss of dry mix after cutting and melting of the backing under intense fire suggest areas for future improvement.

## V. CONCLUSION AND FUTURE WORK

Concrete Cloth (CONCRETE CLOTH) is a unique proprietary material. It is a time & material saving technique. It is very easy to place & handle. Concrete Cloth is a flexible; cement impregnated fabric that hardens when hydrated to form a thin, durable, water & fire proof concrete layer. CONCRETE CLOTH allows concrete construction without the need for plant or mixing equipment. Simply position the canvas & just add water. It is specially used, where the workmanship is very difficult. It is specially used in emergency works such as in military. The study shows that it's a good material for use at temporary as well as permanent purposes Specially in Tunnel Lining, Défense uses, Water proofing, Fencings, and Construction of military runways, and from cost effective point of view Concrete cloth is a competitive alternate product of concrete.

- Door mat used as 3D fibre matrix can be replaced by similar cheap material which can hold dry concrete mix.
- Impervious backing, fibre matrix and pervious top layer may be made monolithic to improve the structure.
- Material used for concrete cloth can be recycled material which will become Eco-friendly.
- Pervious top covering (shade net) can be replaced by a material which has more tiny pores which only allows passing water through it and retains dry concrete mix.



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### KEY FACTORS

- **Easy To Use:** Concrete Cloth is available in man portable rolls for applications with limited a Concrete Clothes or where heavy plant equipment is not available. There is no need for mixing or measuring, the concrete is premixed and cannot be over hydrated. It will set underwater and in sea water.
- **Rapid:** Once hydrated, CONCRETE CLOTH remains workable for 2 hours and hardens to 80% strength within 24 hours. A Concrete Cloth elated or retarded formulations can be produced to meet specific customer requirements.
- **Flexible:** CONCRETE CLOTH has good drape characteristics allowing it to take up the shape of complex surfaces including those with a double curvature. The unset Cloth can be cut or tailored using basic hand tools
- **Strong:** The fibre reinforcement prevents cracking, absorbs energy from impacts and provides a stable failure mode.
- **Durable:** CONCRETE CLOTH is chemically resistant, has good weathering performance and will not degrade in UV. They have a design fife of more than 10 years in shelters. Each shelter is lined with a flame-retardant fibre reinforced polyethylene inner with a BI (DIN 410201 05/98) fire rating.
- **Water proof:** The PVC backing on one surface ensures that the material is completely water proof and chemical resistant.
- **Fire resistant:** It's a ceramic and will not burn.

### MAJOR USES

- Construction of & temporary structures at relief camps or in temporary shelter house.
- Lining of canals where water is to be flowed for the fields for uses of construction works.
- In making the fencings of the house It's used over the barbed wire to provide the additional strength and security.
- It is use to prevent the soil erosion at slope in hilly areas.
- It can be used to repair damaged and unstable gabion walls to provide long-term protection.
- It's also used In making the flooring for various other purposes.

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