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Research Paper

Recycling may be the title of the research, but I see it as the occasion to discuss how we develop and revive our societies and develop their members. How is development?

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Fig.1.. The shaq Al-taban area carries a lot of chaos and deterioration , as well as a lot of value and meaning if compared to similar industrial areas

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Acknowledgment
The author would like to acknowledge the To his father and mother..
love and gratitude .
And he confirms that his large family is the whole area of SHAQ AL – TABAN from themand to them , if there is any benefit to this research

Fig. 2. A painting that expresses the large family of the people of the region

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Acknowledgment

There is thanks from ateamat the building Research Center for those who supported others in atechnical research they did on the uses of marble deposits on the properties of cement compounds and concrete paving blocks . I borrowed some of it in this research , as Iseek to deepen the concept of recycling and its feasibility
I also sent samples of applications I made to the Research Center Also , Igot results that benefit from my research and the ideas I put forward . I need to note ,
Thank and be grateful

Fig. 3 . A painting that expresses everyones cooperation for abetter and smarter tomorrow .

participations between all partners in order to build and achieve anew society that brings goodness to all
Hope and please

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Abstract

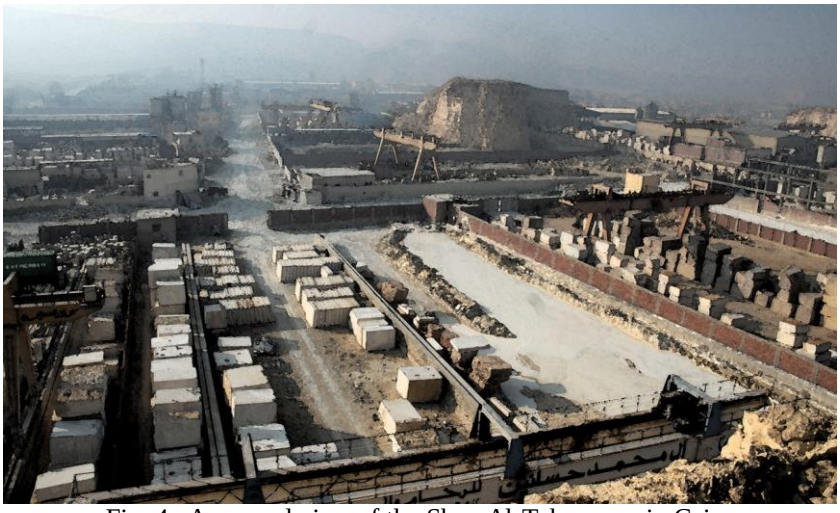

Fig. 4. A general view of the Shaq Al-Taban area in Cairo

The use of these natural materials resulted in waste during
Extraction, transportation, manufacturing, cutting, assembly operations
and removal, which constitutes a burden on the environment in which it is located and leads to
to health, environmental and economic damages.
Waste recycling is a global industry
Profitable, but in Egypt this waste is not exploited
In the best way to take advantage of these wastes in the process
Industrial and investment. Where the economy of some countries is based on
Recycling and benefiting from waste and seeking rehabilitation
Young people using the latest methods and making the most of the resources
Economic.
Therefore, it was necessary to study the causes and nature of these wastes
To reach the appropriate treatments for it, whether by recycling
A safe use or disposal, deals with research
Studying the different types of waste materials for marble and granite
Stones and ways to benefit from them, with a focus on waste
Manufacturing and cutting processes because of their direct harmful effects
on health and the surrounding environment.

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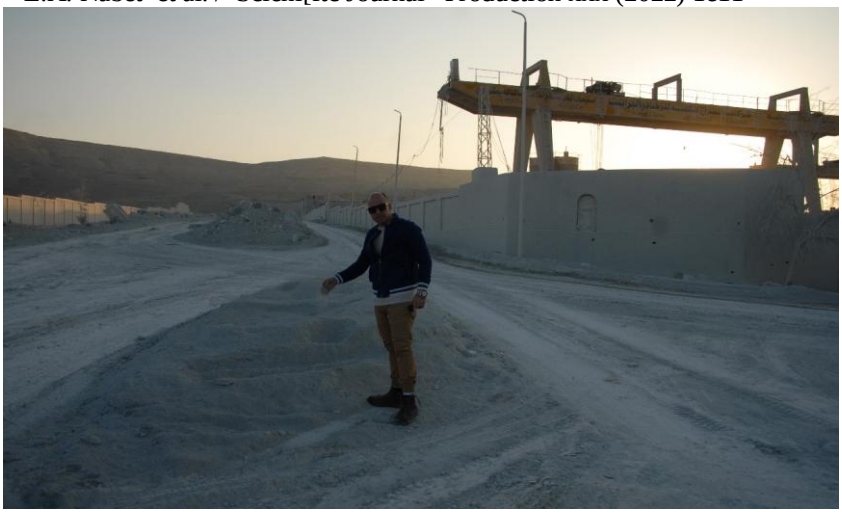

Fig.5. The researcher refers to the remnants of the marble industry in Shaq Al-Taban

It is the waste of factories and workshops
Marble and stone from one of the most dangerous
industrial pollutants to the environment
And health, as the absence of ways
Environmental engineering for proper disposal
them and dispose of them appropriately
random causes a lot of
environmental and health problems,
Therefore, this study is devoted to
To investigate the problem of factory waste
Marble and stone workshops in
Trying to get a method
To exploit and recycle those
waste.

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Materials and methods

Ornamental stones
Ornamental stones represent an important source of quarry wealth in Egypt and one of the most important economic activities globally.
The huge number of these types of stones known around the world, which are used in many ornamental purposes, led to this
The demand for it has increased continuously, whether at the local or global level, especially in the past ten years, as
This industry has witnessed an increasing growth in production rates as a result of the continuous increase in the construction industry sector, which has caused
Accumulation of huge amounts of waste generated during the quarrying operations near the quarry sites, which hinders the expansion processes
Continuous in quarries or during the stages of operation in factories, which exist in a semi-liquid form (liquid) in quantities up to
Thousands of tons are disposed of near the residential areas adjacent to the Shaq Al-Taban industrial area, which constitutes
It is a serious source of environmental pollution for the residents of these areas, as well as for those in charge of the ornamental stone industry.

Fig.6. Places of original quarries and the occurrence of waste or losses also during the work

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Materials and methods

The study aims

The study aims to characterize and evaluate the horrors
Resulting from the operation of some ornamental stones represented in
In the horrors of marble and granite in the Shaq al-Taban area
(South Cairo) and its validity as replacement materials
For binding material (cement) in some applications
Industrial such as concrete paving blocks and slabs
(Interlock) and concrete bricks due to the increase
Continuing cement prices and severe shortage
In the energy sources used and also the pollution
The environment associated with the cement industry and the resulting
The process of combustion of primary raw materials and the emission of quantities
Huge amount of carbon dioxide. as aim
Study to the possibility of using Hualak marble
As a high source of calcium oxide in the preparation
quicklime; To achieve these goals, the division
The study is divided into four successive stages as follows:

Fig.7. The region has appeared to be producing , and at the same time , the remnants of the industry are clear

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The stages

1. The first stage: characterization of the surface of marble and granite:

This stage deals with the study of the condition of marble and also granite using
Many techniques and this stage include the following:
Chemical analysis using X-ray fluorescent technology
(XRF) to determine the content of major and minor oxides as well as
scarce items. The results showed that the main oxide component
For the case of marble is calcium oxide with trace amounts of
Oxides of magnesium, sodium and silicon, while in the case of granite
It is divided into a lizard resulting from a saw gang and another
of a disc cutter, and the main oxides that make up them are
Oxides of silicon, aluminum, sodium, potassium and iron, except that
The proportion of iron and calcium oxide is higher in the first type as a result of adding

A mixture of iron filings with quicklime to facilitate the sawing process.
- Mineral analysis using X-ray diffraction (XRD) technique (shown).
The main mineral in the case of marble is calcite, while in
Granite, we find quartz and feldspar minerals, including albit
The microcline.

Fig.8. Shows the differents stages of the marble industry and the waste generated from it
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The stages

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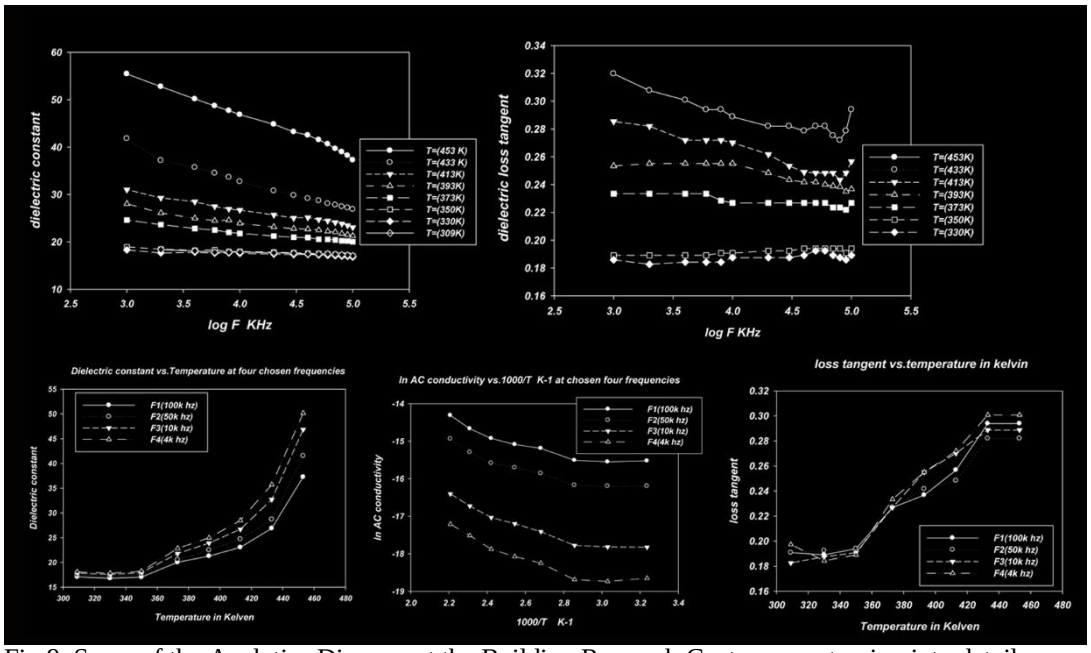

Fig.9. Some of the Analytics Digrams at the Building Research Center are not going into details now

- Granular size distribution using laser technology for volumetric analysis
(BT) showed that about 90% of the quartz sand has a grain size of 27
microns, while 90% of granite silage has a grain diameter of 50 microns.
The surface area using gas adsorption technique showed that samples
The marble surface covers an average surface area of 67.0 m/g

while
Granite silt samples averaged 45.0 m/g.
- Specific weight by the method of water displacement using (Pycnometer Water)
where the results showed that the average specific weight of samples of a lizard

Marble (69.2), while for granite samples, saw chassis (77.2).
(And for cutting disc samples (61.2).
- Whiteness index of marble samples using light reflection technology
The results showed that the average whiteness index was 89.76%.
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The stages
1. The second stage: Preparation and measurement of the different properties
of cement and concrete mixtures and samples of quicklime

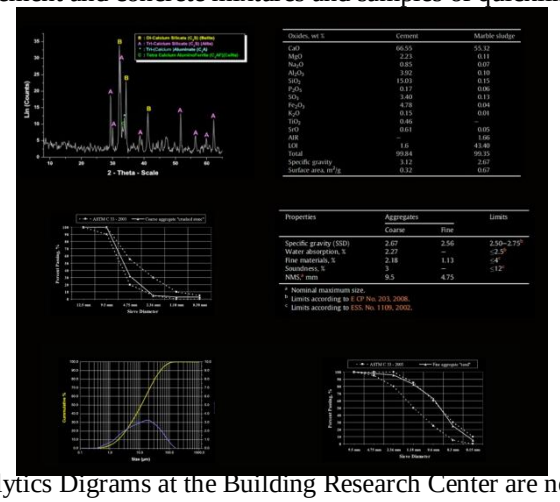

Fig.10. Some of the Analytics Digrams at the Building Research Center are not going into details now

The first section: includes the preparation of several cement mixtures using a varying percentage of marble and granite as alternatives.
For cement in proportions of replacement of the number of preparations where 50% to 40% up to 40%, 30%, 20%, 10%, 0 (13) cement mixture using
The proportion of standard water for each mixture, and the cement slurries were poured and formed into molds in the form of cubes of the size of cubic inches and were
Processed in a humid medium with about 100% humidity for 24 hours, then the cubes were immersed in plain water until the time of measurement
Its physical and mechanical properties for ages ranging from 3, 7, 28 days and procedure
Standard experiments needed to be studied according to American Standard Test Methods
It includes the standard water quantity measurement test and initial and final setting time for mixtures, free lime content and mineral composition
Using X-ray diffraction (XRD), the tests also include measuring the physical properties (water absorption ratio - porosity).
Appearance - total dry and saturated density) and mechanical properties (compressive strength).
The second section: It includes the preparation of several concrete mixtures using a varying percentage of marble sulphate as a substitute for cement with replacement ratios.
0%, 10%, 20%, 30% and up to 40% where (5) concrete mixtures were prepared using the standard water ratio for each mixture, and
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The stages

1. The second stage: Preparation and measurement of the different properties
of cement and concrete mixtures and samples of quicklime

Fig.11. Shaq Al-taban areas recycle but in alimited range

Pour the mixtures and form them in molds with dimensions of 20 * 10 * 6 cm, where the process of mixing and forming was carried out at the Engineering Products Company

Concrete (Technocrete), and the standard tests necessary to study it were conducted according to the American and European standard test methods at the Center.

The National Research Institute includes a test to measure the physical properties (water absorption ratio - the size of the permeable pore area

(Voids) - total dry and apparent density - water absorption rate (permeability coefficient) - resistance to freezing and thawing) and properties

Mechanical (compressive strength - bending strength - wear resistance) at the age of treatment (28 days). The third section: includes burning and calcination

Six (6) samples of marble slough at a temperature of 1000 degrees Celsius and soaking times between 15-30 and 120 minutes.

College

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The stages

1. The third stage: Studying the effect of the sandblasting of marble and granite on the physical and mechanical properties of cement, concrete and lime mixtures.

Fig.12. The researcher refers to the remnants of the marble industry in Shaq Al-Taban

The first section: includes the study of the effect of the silage of marble and granite on the mineral, physical and mechanical properties of cement mixtures.

Fresh and hardened where

The results showed the following:

- Increasing the amount of standard water needed for the mixing process up to 28% by increasing the percentage

of replacement due to the increase in the surface area of the mixture.
Unnoticeable decrease in the initial and final setting times by increasing the replacement ratio compared to the control mixture.
Unnoticeable change in the proportions of calcium silicate resulting from the hydration process, which is responsible for reducing permeability.
Thus, density in the cement body and an increase in durability up to 20% replacement rate.
- Improvement in physical properties (decreased water absorption rate up to 98.2% in the case of marble and 80.3% in the case of granite with
Decrease in porosity up to 38.6% for marble slurry and 12.8% for granite slurry at 28 days of age) up to 20% replacement rate.
- Improvement in mechanical properties (increased compressive strength up to 67.72 MPa for

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The stages

1. The third stage: Studying the effect of the sandblasting of marble and granite on the physical and mechanical properties of cement, concrete and lime mixtures.

Fig.13. The fissure of the tiredness revolves around, but in a limited extent
marble case and 41.72 MPa
For Granite at the age of 28 days) up to a 20% replacement rate.
The second section: includes the study of the effect of marble silting on the physical and mechanical properties of hardened concrete mixtures.
The results showed the following:
- Improvement in the physical properties (decreasing the water absorption rate until the density increased by - 16.75 % until the voids "3 m/kg 168.2"
7.76 % Total up to 17.2 g/cm3 - Decreased absorption rate “permeability coefficient” w/mm 7.7 up to 1/2
Increasing the resistance to freezing and thawing with a decrease in mass losses up to 265.0 kg/m at the age of 28 days) up to a 20% replacement ratio.
- Improvement in mechanical properties (increase in compressive strength up to 6.36 MPa and flexural strength up to 38.4 MPa - increase
Wildebeest resistance up to 0.093 cm/cm2 at 28 days of age) up to a 20% replacement ratio.
The third section: includes the study of the effect of using marble silt on the standard specifications for the quicklime industry, where the results showed what
follows:
Increasing the percentage of lime content by increasing the soaking time (soaking time) up to 30 minutes, which ranged from 44.92% to 83.97%.

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The stages

Fourth stage: Comparing the results with the Egyptian and international standards
The results of tests of composite cement mixtures and concrete were compared
In addition to quicklime with Egyptian and international standards

Fig.14. Trained labor but lacks system and system

whereThe results of the study showedthe following:
First: composite cement mixtures: The study showed that the results of the tests of
Initial and final setting time and compressive strength of all mixtures
Concrete containing marble and granite are within the limits of
Egyptian Standard Specifications No. (2421) for the year and standard specifications
American No. (150C) for the year. 2004
Second: Concrete mixtures: The results of the physical tests are consistent
and mechanical engineering for all hardened concrete mixtures containing
Marble stone with the limits of the Egyptian standard specifications No. (1292 -
1(,) 1292-2 (for the year 2005 related to load-bearing concrete building units)
and non-load bearing manufactured from cement concrete, respectively
Regarding the compressive strength, American Standard Specification No. (902C) for the year 2009 for paving bricks for pedestrians and light traffic
Regarding the ratio of cold water absorption - compressive strength - strength
Al-Bari, No. (55C) for the year 2003 for cement bricks or
Concrete with respect to water absorption mass - compressive strength, No.
(90C) for the year 2011 and Qom) 129) for the year 2003 regarding building units
Concrete or load-bearing and non-bearing concrete respectively with respect to
Water absorption mass - compressive strength. Also correspond to the limits
European and British Standard Specifications No. (1338) for the year 2003

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The stages

Fourth stage: Comparing the results with the Egyptian and international standards
The results of tests of composite cement mixtures and concrete were compared
In addition to quicklime with Egyptian and international standards

Fig.15.The potential of large industrial areas, but …..
For concrete paving blocks with respect to the resistance of
Wild and resistance to freezing and thawing.
Third: Quick Lime: The results of lime content and degree tests were compared
Reactivity of quicklime samples from limestone sludge
"Marble" with American and European Standard Specifications, which showed results
The comparison corresponds to the percentage of lime content resulting from burning Sahala samples
Marble with American Standard Specification No.: Uses and related matters
2002 (C1529) and 1999 (C911) chemical for lime
In many industries, including the paper industry and the drinking water purification industry
(Percentage of lime content ≤ 90%) and American Standard No.
(55C) for the year 2003 related to the use of lime for construction purposes
(Lime content percentage ≤ 75.) % in relation to the degree of reaction of quicklime with
In water, quicklime resulting from burning a marble silt is classified as lime
High activity as the degree of reactivity.) 30 ≤ Rdin

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Research problem

Fourth stage: Comparing the results with the Egyptian and international standards
The results of tests of composite cement mixtures and concrete were compared
In addition to quicklime with Egyptian and international standards

Fig.16. How waste represents a source of an essential component of the environment

The waste resulting from the cutting, shaping and manufacturing processes
Marble, granite and stones in the areas of marble factories) such as
The industrial zone of Shaq El Thoban area in Egypt (to
The emergence of the problem of environmental pollution, which is the spread of
Huge amounts of dust in the atmosphere of the surrounding residential areas,
There is also a problem with industrial waste
Products that cannot be easily disposed of in
Sanitation of the area due to its large size and causing damage
to the sewage network as well as its environmental damage, and the order is not limited to
Pollution on the marble and granite manufacturing area alone, but that
Current disposal of waste can lead to
Exporting pollution to the inhabitants of the surrounding areas, where it gets rid
Owners of this industry from the waste of manufacturing in a different way
intact by throwing it into the surrounding areas without consideration
to any environmental or health standards.

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Questions

Fourth stage: Comparing the results with the Egyptian and international standards
The results of tests of composite cement mixtures and concrete were compared

Fig.17 . A large industrial production system, what is missing ?

Mention what construction waste is, how to preserve the environment,
waste disposal strategies, and recycling processes
Rotation in its various forms?
Is there an environmental management system for municipal waste globally followed?
Explain the most important features of the history of the marble and granite industry
and their uses in architecture?
What are the stages of the marble and granite industry and the waste generated during
the various industrial processes?

What are the engineering characteristics of the waste of marble factories and workshops and how to recycle it and its various uses?

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The main objective

Fig.18. Shaq Al-Taban area dreams of turning into a beautiful area free from pollution and compatible with the environment

The research aims to extract a scientific methodology
To recycle building materials waste with an application
I worked on the marble and granite industry to achieve
Environmental, social and economic benefit.
Because there is no real plan to get rid of
The problem of pollution caused by factory waste
Marble and stone workshops, and because of the lack of
Actual studies to investigate the properties of these wastes
And the possibility of use in different industries or
Disposing of them in a sound environmental engineering way
This study is to cover some points in this
field and to be the beginning of future studies to end
A radical solution to this problem.
The main objective of the research is to get rid of
Environmental pollution resulting from the waste of marble factories
and stone, by recycling used water
The possibility of using the waste in the manufacture of materials
Construction such as bricks, anti-lock or disposal
Environmentally sound engineering.

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Hypothesis

Fig.19. Developed industrial areas in the world

It was found from the process of recycling the wastes of the marble and granite industry that the sedimentary materials resulting from the liquid waste (Sahla) after drying the water has engineering properties of sandy soil in addition to containing a high percentage of carbonate

Calcium CaCo 3, which is considered as a binder and has features that qualify it for some industrial and construction applications, and therefore the researcher

It assumes the possibility of sedimentation of these materials in an engineered sedimentation basin, their collection, water recycling and the possibility of using the materials

Sediment in the building materials industry such as (brick industry) and getting rid of the pollution resulting from it.

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Research field

Fig.20. Recycling is done naturally without outside interference

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Previous experiences:

Fig.21. Is it possible to turn Shaq Al-Taban into safe residential areas , but how ?

The waste from marble and stone factories, after drying and grinding, was used in successful manufacturing processes that included:
PVC plastic tubes using 3.3% residues as a financial material instead of calcium carbonate
CaCo 3 to PVC % 5.. 3 PVC and gave test results good.
Pottery pots using a ratio of 35% waste to 35% pottery paste, and no cracks
or abnormal phenomena occurred.
Ceramic pots and mugs using 35% residue to 05% ceramic paste and gave satisfactory test results.
Wall paint using 25% residues in the paint mixture as a substitute for CaCo3 Calcium Carbonate and has been tested with complete success.
Paint base paste and tested successfully.
Ceramic figures and antiques by pouring the waste with an addition of 43% white
cement into plastic moulds.

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