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HUMAN WELFARE ASSOCIATION

(A Sustainable Development Resource Centre)

S- 15/16-2AC, Mawaiya, Sarnath, Varanasi-7, INDIA

To,

Date: 05.05.2018

The Registrar of Geographical Indications
Geographical Indications Registry,
Intellectual Property Office Building,
G.S.T. Road, Guindy, Chennai - 600 032

Sub: Submission of Revised and amended application for G.I. Application
No. 557 – Chunar Sand Stone

Dear Sir,

With reference to your Examination Report vide your letter No. GIR/App.No.557/ER/2017-18/37, dated May 08, 2017 we are sending the revised and amended GI Application with the related documents for your kind consideration. We have already submitted the Logo, original attested Map of the geographical area with related documents and photographs.

We are grateful to the GI Registry for their kind support.

With Regards,

(Dr. Rajani Kant)

General Secretary

Human Welfare Association,

Varanasi Region



GI Application

For

Registration of “Chunar Sand Stone” of Uttar Pradesh

Through

Geographical Indication of Goods

under GI Act of Intellectual Property Right

Applicant

- 1. Consortium of Handicraft & Artisans Society**
- 2. Human Welfare Association, Varanasi**

**Information provided – Point by point on the basis of GI Examiner
Report with Revised and amended Application**

Sub: "Chunar Sand Stone" G.I. Application No.557

The following information / document / forms furnished / filed for compliance

1. **The Consultative Group strongly felt that Association of Producers to be the Applicant and Human Welfare Association to act as Facilitator.**
Agreed - "Consortium of Handicraft & Artisans Society treated as Applicant & Human Welfare Association to act as Facilitator
2. **The Logo of GI product to be amended and graphically represented for better identification and protection of GI Rights.**
Agreed – The name of GI product is "Chunar Sand Stone".
3. **Documentary evidence relating to validity of registration of the Applicant to be provided.**
Renewal certificate Enclosed
4. **The specification & description of the GI product to be clearly redrafted to include technical specification such as Chemical & Physical Characteristic of GI product.**
Annexure-1 is attached in this application
5. **The characterization of Chunar Sand Stone such as saturated crushing strength, Density, Porosity, Specific Gravity, Bending Strength, Water Absorption, Thermal behavior etc to be provided.**
Detail description about the origin and formation of Sand stone is given in Annexure No.4 in this document.
Research document of BHU Varanasi published in International Journal of Earth science and engineering pages 66-72. Attachment 1 in annexure 6 as supportive document for Physical & Chemical composition and Uniqueness of Sand stone
6. **How Sand Stone is different from other stone based on scientific behavior.**
A comparative chart between difference in Sand stone and other stone like – Lime Stone, Shale stone, Quartzite stone, and Slate stone has given in the application format, Statement of Case and in Annexure-4
7. **Detailed information regarding the process sequence and method of production of Chunar Sand Stone to be provided.**
Detail process of Formation of Sand stone has mentioned in Annexure-4 in this application document.
8. **The applicant shall file an undertaking before the GI Registry that they shall abide by the present and future norms and laws relating to Mines, Forestry in India with respect to production & supply.**
The applicants will follow all the norms, rules and regulations and laws related to Mines, Forest department of India.

9. **An undertaking to be filed by the applicant that “No child labourers are engaged” in the manufacturing process.**

Undertaking Attached Separately

10. **Demarcation of GI area of production of Chunar Sand Stone:** To provide two copies (one original and one certified preferably in A4 or A3 size) of the map of the territory, region or locality demarcating Geographical area of production in which the goods relating to the Geographical indication are being produced or manufactured issued from a competent statutory authority giving details of the longitude and latitude of the production area.

Annexure-2 is attached in this application. The Original Map with attestation by the concern officer of this region has already submitted with the original application.

11. **Upon Registration the Applicant has to comply with the following Post Registration conditions:**

- ❖ **To ensure for registration of producers of Chunar Sand Stone as Authorized Users.**

The applicant is assuring that we will involve in the Post GI initiative and will mobilize the local Master artisans, cooperatives, societies, traders & exporters for Authorize User registration.

- ❖ **Further, for registration of Authorized User a condition has been placed that “Every Application for Registration of Authorized User shall be supported by an “No Objection Certificate” from the Applicant stating the following information of the proposed Authorized User:**

- **He is a producer within the GI Area of Production;**

We are agreed with this point and will provide the “No Objection Certificate”

- **He complies with production & quality standards of GI Product.**

We are agreed this point and will ensure the quality, standard of the GI product.

- ❖ **To submit a report within one (1) year to the Registry, regarding the impact of GI Registration and means of propaganda used for promotion of GI.**

We are agreed with this point and will submit a report to the GI Registry of the impact of GI registration of this GI registered product.

- ❖ **Further, for registration of Authorized User a condition has been placed that “Every Application for Registration of Authorised User shall be supported by an “No Objection Certificate” from the Applicant stating the following information of the proposed Authorised User:**

- **He is a producer within the GI Area of Production;**

- **He complies with production & quality standards of GI Product.**

- ❖ **To submit a report within one (1) year to the Registry, regarding the impact of GI Registration and means of propaganda used for promotion of GI.**

12. **The Committee acknowledged the reputation of the GI product and on compliance of the above requirements; the matter shall proceed further as per the provisions of the Act & Rules.**

We are agreed this point

**GEOGRAPHICAL INDICATION OF GOODS
(REGISTRATION & PROTECTION ACT – 1999)**

FORM GI – 1C

**Application is hereby made for the Registration in Part A of the
Register of the accompanying Geographical Indication
Furnishing the following particulars**

1A	Name of the Applicant	1. Consortium of Handicraft & Artisans Society By its Kiran Prasad Vishwakarma
		2. Human Welfare Association, represented By its Dr. Rajani Kant
1B	Address	1. President Consortium of Handicraft & Artisans Society S.15/116, Mawaiya, Sarnath, Varanasi
		2. General Secretary, Human Welfare Association, S.15/116,2-AC, Mawaiya, Sarnath, Varanasi-U.P.
1C	List of association of persons/ producers/ organization/ authority	A detailed list will be furnished if requested
1D	Type of Goods	Class-19: Natural Goods- Chunar Sand Stone
1E	Specification	The detailed specification of the different products is also attached in the Annexure-2
1F	Name of the geographical indication (and particulars)	Chunar Sand Stone
1G	Description of the goods	Mirzapur , Chandauli , , and Sonebhadra of Uttar Pradesh is much famous for its exclusive Chunar Sand Stone since thousands years ➤ Various type of Statues ➤ Fort, Old monuments, Decoratives items, Ghats,
1H	Geographical area of production and map	Mirzapur , Chandauli , , and Sonebhadra
1I	Proof of origin (Historical records)	The most celebrated capital (the four-lion one at <u>Sarnath</u> (Uttar Pradesh)) erected by Emperor Ashoka circa 250 BC. also called the "Ashoka Column" . Four lions are seated back to back. At present the Column remains in the same place whereas the Lion Capital is at the Sarnath Museum. This Lion Capital of Ashoka from Sarnath has been adopted as the <u>National Emblem of India</u> and the wheel "Ashoka Chakra" from its base was placed onto the centre of the <u>flag of India</u> . The lions probably originally supported a <u>Dharma Chakra</u> wheel with 24 spokes, The pillar at Sanchi also has a similar but damaged four-lion capital. There are two pillars at Rampurva, one

		<p>with a bull and the other with a lion as crowning animals. <u>Sankissahas</u> only a damaged elephant capital, which is mainly unpolished, though the abacus is at least partly so. No pillar shaft has been found, and perhaps this was never erected at the site.</p> <p>The <u>Vaishali</u> pillar has a single lion capital. The location of this pillar is contiguous to the site where a Buddhist monastery and a sacred coronation tank stood. Excavations are still underway and several stupas suggesting a far flung campus for the monastery have been discovered. The lion faces north, the direction Buddha took on his last voyage. Identification of the site for excavation in 1969 was aided by the fact that this pillar still jutted out of the soil. More such pillars exist in this greater area but they are all devoid of the capital</p>
1J	Method of Production	<p>Characteristics of Sandstone of Chunar.</p> <p>Sandstone is a classic sedimentary rock that is made up of cemented sand grains and has a gritty feel to it. this is the term used when sand has been compacted together under such force so as to be turned into solid mass rather than individual grains of sand. it looks weird.</p> <p>A. Rock has sparkly or alternating color layers that are bent or folded.</p> <p>B. Rock has layers and smaller pieces of rock in it. It also has fossils in it.</p> <p>C. Rock has holes in it, and it has a glassy appearance.</p> <p>D. Rock contains mineral crystals that have grown together.</p> <p>Sandstone is much like compressed sand. It is soft and the granules will easily come off and reform sand. It is often colorful and can have many layers.</p> <p>Sandstone Formation:</p> <p>Accumulating deposits of sand from wind or water deposition are initially created. The weight from the deposits above cause compaction of the lower deposits. Compaction forces out air and water that exists between the sand grains. Minerals form from the remaining concentrated solutions in a process called precipitation. These minerals act as cement which binds the particles of sand together, creating sandstone. Sandstone is formed by sand-sized minerals or rock grains. It is a clastic sedimentary rock that has the most common minerals in the Earth's crust such as feldspar or quartz.</p> <p>Here, an attempt is being made to analyse the P & S wave velocities in chunar sandstone of Mirzapur district of U.P. and to evolve a relationship between wave velocities and strength of the rock.</p>

		<p>Laboratory Investigations:</p> <p>The equipment Sonic Viewer – SX, model – 5251B, make – OYO is used to measure the propagation delay time of the applied ultrasonic wave of the rock specimen which determines the following properties-</p> <ul style="list-style-type: none"> • P wave Velocity • S wave Velocity • Dynamic Poisson's Ratio • Dynamic Shear Modulus <p>Dynamic Elastic Coefficient</p> <p>Studies have been conducted to find the temperature dependence of P and S wave velocities. Scientists measured elastic P and S wave velocities and velocity anisotropy of porous dacitic rocks from Unze volcano, Japan³. Measurements were taken at temperature upto 600°C and confining pressure of 100 MPa, corresponding to depths of 3000 to 4000 m. In contrast to low porosity magmatic and metamorphic rocks, the seismic velocities of the investigated volcanic rocks increased and the velocity anisotropies decreased with increasing temperature due to further sample compaction</p>
1K	Uniqueness	<p>The National Emblem of Govt. of India is taken as Ashoka Pillar of Sarnath which has made by Chunar Sand Stone is a unique example of there strength, quality and composition because from beginning of 250 BC. It is also in the same manner with same quality at Sarnath Museum of Varanasi.</p> <p>The most celebrated capital (the four-lion one at <u>Sarnath (Uttar Pradesh)</u>) erected by Emperor Ashoka circa 250 BC. also called the "Ashoka Column" . Four lions are seated back to back. At present the Column remains in the same place whereas the Lion Capital is at the Sarnath Museum. This Lion Capital of Ashoka from Sarnath has been adopted as the <u>National Emblem of India</u> and the wheel "Ashoka Chakra" from its base was placed onto the centre of the <u>flag of India</u>.</p> <p>Chunar Fort which has made by Chunar Sand Stone with the support of local artisan.</p> <p>The town of the same name is part of the fort's administration.</p>



Painting of the fort (1803)

The fort stands on a rock, a detached part of the Vindhya Range at an elevation of 280 feet (85 m) above sea level. It was built in a commanding position, high above a meander in the Ganges River. The approach to Chunar Hill is marked by a chain of low hills, running parallel to the river on its right bank, which is covered by plantations and bungalows. The fort is located on a rock which rises abruptly from the plain, and encroaches into the river for some distance.^[4] The southeastern part of the fort is on the rocky bank by the Ganges River, which is navigable for 50-60 ton boats. The batteries in the fort command the river reach. The rocky bluff rising from the river on which the fort has been built raises to a height of 104 feet (32 m). Another 200 feet (61 m) further away, the elevation of the rocky hillock is 280 feet (85 m).

The impregnable citadel is built with huge ramparts overlooking the river and built in tiers. They were built of local sandstone quarried in the area Chunar quarries, notable since the Maurya period, were used in building the fort, and skilled masons were available locally. The area bounded by the fort covers a length of 750 yards (690 m) in the north-south direction with a maximum width of 300 yards (270 m) on the northern face, close to the river bank. The peripheral length of the fort is 1,850 yards (1,690 m). The ramparts of the fort have towers built at regular intervals with heights varying from 10–20 feet (3.0–6.1 m).

There are many legends linking the fort to divine aspects. One such is the story of King Bali. God, known in these parts as *Bawan Bhagwan*, appeared before Bali, disguised as a Brahmin, and begged for three feet of land. The generous king agreed. God placed his first step on the hill of Chunar Fort and left his foot mark there. Since then it is known as “Charanadri”, which over the years took the short form of “Chunar”.

The second legend is about a semi-mythical king called Vikramāditya of Ujjain. His brother Bharthari, who opted to live the life of a hermit, started living near the rockface of Chunar. Realising his brother's situation, Vikramadiathya visited Chunar, and after finding out his brother's whereabouts through the hermit Goraknath, built a house for his brother to live in. The black stone where the saint Bhatinath lived and prayed is worshiped even now, as it is believed that Bhatinath is seated in the fort area in an invisible form.

The Unique characteristic of the formation of the Sand stone as also mentioned in Annexure No.4

		<p>Physico-mechanical properties of Chunar Sandstone-</p> <p>The study of propagation of waves in rock mass provides information regarding the physico-mechanical properties. A lot of studies have been conducted in the field of P and S waves all across the world. An attempt has been made to study the P and S wave velocity in Chunar Sandstone and to evolve a relationship between wave velocities and its strength. It has been concluded that brittleness of rocks tends to increase with increase in wave velocities. However, no definite relationship between strength and wave velocities of rocks could be determined. Such a correlation is significant because measurement of P & S wave velocities involve non-destructive testing and if an idea about the strength of the rocks could be gauged from their wave velocities, then it would help in doing away with much of the rigour of destructive testing in laboratories. (mentioned in Annexure-1)</p>																
<p>Qualitative differences between Sand stone and other stones</p>		<p>Qualitative differences between Sand stone and other stones – We are giving the few examples between Sand Stone and other stones in a comparative chart.</p> <p>Difference Between Sandstone and Limestone</p> <table border="1" data-bbox="678 1054 1476 2007"> <thead> <tr> <th data-bbox="678 1054 1077 1099">Sandstone</th> <th data-bbox="1077 1054 1476 1099">Limestone</th> </tr> </thead> <tbody> <tr> <td data-bbox="678 1099 1077 1168">➤ Sandstone is a widely found sedimentary rock.</td> <td data-bbox="1077 1099 1476 1168">➤ Limestone is commonly found in marine environments, and they are classified as sedimentary rocks.</td> </tr> <tr> <td data-bbox="678 1168 1077 1236">➤ It is formed in many environments such as oceans, lakes, deserts, etc.</td> <td data-bbox="1077 1168 1476 1236">➤ Limestone is defined as being primarily composed of calcium carbonate, which often comes from plant and animal material such as the shells of mollusks.</td> </tr> <tr> <td data-bbox="678 1236 1077 1304">➤ They are mostly formed by sand grains; therefore, contain quartz and feldspar in high quantities.</td> <td data-bbox="1077 1236 1476 1304">➤ These are mainly formed in shallow, warm and calm waters. Biological activity also plays an important role in forming limestone.</td> </tr> <tr> <td data-bbox="678 1304 1077 1372">➤ There can be different types of sandstones in various colors. Sandstones are used for cement or glass manufacturing.</td> <td data-bbox="1077 1304 1476 1372">➤ Normally, they are formed in waters where carbon dioxide concentration is low so that the sedimentation is quite easy. Marine water receives calcium from land.</td> </tr> <tr> <td data-bbox="678 1372 1077 1440">➤ It has an aesthetic value, as well as an ornamental value.</td> <td data-bbox="1077 1372 1476 1440">➤ When these are accumulated in the form of calcite (other waste materials also tend to incorporate into this when accumulating), they are known as limestone.</td> </tr> <tr> <td data-bbox="678 1440 1077 1508">➤ They can be cut, polished and then used as tiles or beautiful rocks for buildings or as monuments.</td> <td data-bbox="1077 1440 1476 1508">➤ They are also categorized as biological sedimentary rocks. There is another type of limestone known as chemical sedimentary rocks.</td> </tr> <tr> <td data-bbox="678 1508 1077 1576">➤ Sandstone is not defined by any one substance. It consists of sand sized particles, which range from 0.0063 to 2mm in size. It often contains quartz., though it does not have to. Other common components of sandstone include feldspar, mica, lithic fragments</td> <td data-bbox="1077 1508 1476 1576">➤ They are formed by direct</td> </tr> </tbody> </table>	Sandstone	Limestone	➤ Sandstone is a widely found sedimentary rock.	➤ Limestone is commonly found in marine environments, and they are classified as sedimentary rocks.	➤ It is formed in many environments such as oceans, lakes, deserts, etc.	➤ Limestone is defined as being primarily composed of calcium carbonate, which often comes from plant and animal material such as the shells of mollusks.	➤ They are mostly formed by sand grains; therefore, contain quartz and feldspar in high quantities.	➤ These are mainly formed in shallow, warm and calm waters. Biological activity also plays an important role in forming limestone.	➤ There can be different types of sandstones in various colors. Sandstones are used for cement or glass manufacturing.	➤ Normally, they are formed in waters where carbon dioxide concentration is low so that the sedimentation is quite easy. Marine water receives calcium from land.	➤ It has an aesthetic value, as well as an ornamental value.	➤ When these are accumulated in the form of calcite (other waste materials also tend to incorporate into this when accumulating), they are known as limestone.	➤ They can be cut, polished and then used as tiles or beautiful rocks for buildings or as monuments.	➤ They are also categorized as biological sedimentary rocks. There is another type of limestone known as chemical sedimentary rocks.	➤ Sandstone is not defined by any one substance. It consists of sand sized particles, which range from 0.0063 to 2mm in size. It often contains quartz., though it does not have to. Other common components of sandstone include feldspar, mica, lithic fragments	➤ They are formed by direct
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and biogenic particles.

➤ Sandstone is formed from the breakdown of larger rocks due to weathering and erosion as well as from processes that occur within the rock, usually biologic but sometimes chemical in nature.

precipitation of calcium carbonate in sea water. However, the biological sedimentary rocks are more abundant than chemical sedimentary rocks.

- In pure limestone, only calcite is there, but often they can contain impurities by mixing other materials like sand. So, limestone can be defined as a sedimentary rock, containing more than 50% of calcium carbonate in the form of calcite.
- Some of the common lime stones are chalk, coquina, lithographic limestone, oolitic limestone, fossiliferous limestone, tufa, etc. There are many usages of limestone too.
- Limestone has a basic nature; it is used to neutralize acidic water bodies.
- Limestone often forms from whole or pieces of a variety of organisms that contain calcium carbonate, such as mollusks, echinoids and corals. Most limestone beds form in marine environments where large deposits of organisms and carbonate precipitation build up over time.


Difference Between Sandstone and Shale

Sandstone	Shale
Sandstone is made primarily of sand and has a larger grain.	Shale is made primarily from clay and has a much finer grain than sandstone.
Sandstone is sedimentary rocks, and is basic type known as classic sedimentary rocks. This type of rock is formed from the weathering of debris and not from any chemical reactions. sandstone are common types of rocks, and same density as Shale.	Shale is also sedimentary rocks, and is basic type known as classic sedimentary rocks. This type of rock is formed from the weathering of debris and not from any chemical reactions. Shale is common types of rocks, and same density as Sandstone.
Sandstone is made of sand-sized mineral particles, most often sand it. Along with the sand, there is a material in the sediment known as the matrix and also an additional material that holds all the grains together.	Shale is formed when silt and clay-sized minerals compact together over time. Slate must be composed of at least 67 percent clay. The remaining part of shale includes larger particles of silt or gravel, minerals and organic matter.

Difference between sandstone and slate Stone

Sand Stone	Slate Stone
Sandstone is a sedimentary rocks	Slate is a metamorphic rock come from mud stone with a high

			temperature and pressure.
		Silica is the main ingredients of sandstone	Chemically slates compose of Argil i.e Clay,
		Difference between sandstone and quartzite	
		Sand Stone	Quartzite
		<p>Geologically, sandstone is a sedimentary rock.</p> <p>Sandstone contains sand-sized grains of rock fragments and individual minerals broken down from other, older rocks. Geologists also know that sand-sized grains have a particular measurement, from about 1/16th of a millimeter to 2 millimeters.</p> <p>The popular colors are K. Black, Brown, Tan, White, Yellow, Bansi Pink and Red, Grey.</p> <p>Sandstone is basically used for outdoor applications. Pavers, stepping stones, external wall cladding, decorative articles and statues are common application of sandstone.</p> <p>Sandstone is relatively soft and porous and appears appealing in weathered texture.</p> <p>The same test on sandstone will not lead to multiple bounces, as the softer rock will absorb the impact much quicker.</p> <p>Sandstone is more friable (less compact) and fractures along areas of looser cementation.</p> <p>Sandstone has a fairly even and coarse texture.</p>	<p>Quartzite is a metamorphic rock like marble.</p> <p>Quartzite is a rock with an identity crisis. Particularly when it is used as a building material, quartzite often gets mistaken for marble or light colored granite.</p> <p>Quartzite is preferred for interior installations. Quartzite are basically used for interior flooring, vanity tops, countertops, backsplashes, kitchen islands and even wall covering.</p> <p>Quartzite has the looks of marble, but bears properties like granite. This means it is very strong, durable, less porous and resistant to high temperature and looks amazing in glossy finishes.</p> <p>Quartzite is a much harder rock. If you let the head of a geologists pick fall on quartzite from about 15 cm the hammer will bounce several times (keep the handle of the pick loosely in your hand so it can pivot). Quartzite is also much finer grained. Quartzite is both a harder and more compact rock, meaning that it is less easily scratched and fractured. As a result, a quartzite sample will fracture across the grain. quartzite texture has a less even surface grain.</p>
1L	Inspection Body	<ol style="list-style-type: none"> 1. The Department of Industries, Government of U.P. 2. Department of Mines, Govt. of India 3. Experts of Universities and Research institutions. 4. O/o Development Commissioner (Handicraft), Govt. of India having office at Varanasi. 5. Human Welfare Association, Varanasi 6. Group of Master craftsman and Awardees. 	
1M	Others		

Logo	Chunar Sand Stone 
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Along with the Statement of Case in **Class 19** in respect of the name(s) of whose addresses are given below who claim to represent the interest of the producers of the said goods to which the geographical indication relates and which is in continuous use in respect of the said goods.

1. The application shall include such other particulars called for in rule 32(1) in the Statement of Case:

The statement of case with detail particulars is attached.

2. All communications relating to this application may be sent to the following address in India.

1. Kiran Prasad Vishwakarma
President
Consortium of Handicraft & Artisans Society
S.15/116, Mawaiya, Sarnath, Varanasi
2. Dr. Rajani Kant
General Secretary,
Human Welfare Association,
S.15/116, 2-AC, Mawaiya, Sarnath,
Varanasi-U.P.
Mob.9415304759

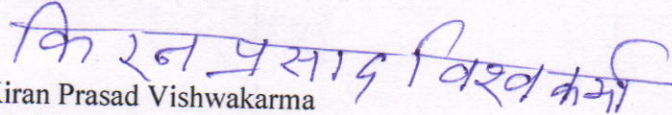
4. In the case of an application from a convention country the following additional particulars shall also be furnished.

Designation of the country of origin of the Geographical Indication.

Evidence as to the existing protection of the Geographical Indication in its country of origin such as the title and the date of the relevant legislative or administrative provisions, the judicial decisions or the date and number of the registration and copies of such documents.

Not Applicable

SIGNATURE:

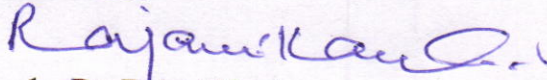


1. Kiran Prasad Vishwakarma
President

NAME OF THE SIGNATORY

Dated this 28th June, 2017

SIGNATURE



1. Dr. Rajani Kant
General Secretary

NAME OF THE SIGNATORY

Dated this 28th June, 2017

Statement of Case for Chunar Sand Stone

- 1- India has a glorious tradition Harappa and Mohenjo-Daro have been carefully preserved by the museums in India. Today, a large variety of materials are used for the manufacture of the figures of Gods and Goddesses who reveal their spirit in an artistic expression are very helpful for the learning about the rituals, customs and mythology.
- 2- **Chunar** is situated in the Vindhya range at a distance of 42 kms. Its District headquarters Mirzapur which is a very famous for its natural beauty, Historical events, Handicrafts & other Industrial setups and from the religious aspects as well. Especially Chunar town is existing in a triangular form on the right bank of holy Ganga and the left bank of the Jirgo. As Per Puranas the oldest name of Chunar was Charanadri as Lord Vishnu had taken his first step in his Vaman in carnation in the dynasty of Great King Bali in the age of Satyug. It also told that a very powerful man had travelled from Himalya to Kanya Kumari in the age of Dwapar and took rest here whose feet impression a rock became todays Chunar. The third one deals with Bhartihari, the ruler of Ujjain who came here for penance. A kingdom was later on built here. The fourth story sheds light on a rock statue built by Raja Sahadeo, who named the place as Nainagarh. However Chunar is highlighted after the visit of Babar followed by Shershah Suri, Humayun, Akbar, Aurangzeb and finally, ' the Britishers.
- 3- As of 2011 India census, Chunar had a population of 37,185. Males constitute 53% of the population and females 47%. Chunar has an average literacy rate of 57%, lower than the national average of 59.5%: male literacy is 66% and, female literacy is 47%. In Chunar, 16% of the population is under 6 years of age. Chunar (Mirzapur) Municipal Board (NPP) Name District City of Outgrowth Population census 1991-03-01- 27,778 Population censuses- 2001-03-01- 33,933 Population census-2011-03-01- 37,185 Source: Office of the Registrar General and Census Commissioner (web), Delimitation Commission of India (web).
- 4- **Chunar Fort History** which has already made by **Chunar Sand stone**, basically the fort of Chunar was established by Maharaja Vikrmaditya the King of Ujjain to commemorate the stay of his brother Raja Bhartihari who had taken his Samadhi in alive stage and still that Samadhi Sthal is worshiped. As per Alha Khand in 1029 AD. King Sahadeo made this fort as his capital and established the statue of Naina Yogini in a cave of Vindhya hill and put the name as Nainagarh. King Sahadeo built a stone umbrella based on 52 pillars in the memory of the victory on 52 other kings, inside the fort which is still preserved. He had a brave daughter who got married with Alha the then King of Mahoba whose marriage place in still preserved with the name of Sonya Mandap. Beside this some other stories are also related with the fort as

Magna- Deogarh, Ratan Deo's Burj (tower) and King Pithaura who named it Patthargarh as well. It has got much importance due to the stay of the founder of Mughal Dynasty Babar in 1525 AD. Later on Shershah Suri obtained the possession of the fort by marrying the wife of Taj Khan Sarang-Khani, the Governor of Ibrahim Lodi. In 1531 AD. The second King of Mughals Humayun done an unsuccessful effort to capture this fort. In 1574 AD. Akbar the great captured this fort and since that very time it was in the Mughal regime upto 1772 AD. Once emperor Jahangir appointed one Iftikhar Khan as Nazim and in the regime of Aurangzeb one of his Governor's Mirza Bairam built a mosque in 1663 AD. near the Bhairo-Burj. In 1772AD this fort was captured by East India Company who established in it a depot of Artillery and ammunition. Later it was taken by Maharaja Chet Singh of Benaras temporarily and after Chet Singh outbreak in 1781 AD. Warren Hestings retired for safety to Chunar where a force was collected by Major Phophan, which expelled Chet Singh from his strong hold in his neighbourhood. Hastings liked the situation and climate, his residence is still standing. Near it, there is a Sundial bearing the inscription. "Erected by order of the Hon'ble Warren Hestings. Esq. Governor General c & e in 1784". **Latitude 25' 07' 36' N and Longitude 83' 09 15" E** , from Greenwich. James S. Ewart Lieutenant." At present it is the Training Centre of Provincial Armed Core (PAC)

- 5- There are many legends linking the fort to divine aspects. One such is the story of King Bali. God, known in these parts as *Bawan Bhagwan*, appeared before Bali, disguised as a Brahmin, and begged for three feet of land. The generous king agreed. God placed his first step on the hill of Chunar Fort and left his foot mark there. Since then it is known as "Charanadri", which over the years took the short form of "Chunar
- The second legend is about a semi-mythical king called Vikramāditya of Ujjain. His brother Bharthari, who opted to live the life of a hermit, started living near the rockface of Chunar. Realising his brother's situation, Vikramadiathya visited Chunar, and after finding out his brother's whereabouts through the hermit Goraknath, built a house for his brother to live in. The black stone where the saint Bhatinath lived and prayed is worshiped even now, as it is believed that Bhatinath is seated in the fort area in an invisible form. A vivid detail has been given in the book written by historian upinder singh which reflects the relation between ancient sandstone craft of Chunar and Mauryan empire, the book also signifies thatb how sandstone becomes instrumental in propogating

A History of Ancient and Early Medieval India: from the Stone Age to the 12th Century:
The Maurya empire pages 358 to 359. Book by great historian "upinder singh" attachment 4 in
annexure 6

All the pillars were placed at Buddhist monasteries, many important sites from the life of the Buddha and places of pilgrimage. Some of the columns carry inscriptions addressed to the monks and nuns.^[4] Some were erected to commemorate visits by Ashoka. The traditional idea that all were originally quarried at Chunar, just south of Varanasi and taken to their sites, before or after carving, "can no longer be confidently asserted",^[5] and instead it seems that the columns were carved in two types of stone. Some were of the spotted red and white sandstone from the region of Mathura, the others of buff-colored fine grained hard sandstone usually with small black spots quarried in the Chunar near Varanasi. The uniformity of style in the pillar capitals suggests that they were all sculpted by craftsmen from the same region. It would therefore seem that stone was transported from Mathura and Chunar to the various sites where the pillars have been found, and there was cut and carved by craftsmen. The uniformity of style in the pillar capitals suggests that they were all sculpted by craftsmen from the same region. It would therefore seem that stone was transported from Mathura and Chunar to the various sites where the pillars have been found, and there was cut and carved by craftsmen.

Book monograph on stone carving in the united provinces by H.S.CROSTHWAITE, ICS in 1906 (pages 10,16,17,18,19) attachment 6 in annexure 6.

-The pillars have four component parts in two pieces: the three sections of the capitals are made in a single piece, often of a different stone to that of the monolithic shaft to which they are attached by a large metal dowel. The shafts are always plain and smooth, circular in cross-section, slightly tapering upwards and always chiselled out of a single piece of stone. The lower parts of the capitals have the shape and appearance of a gently arched bell formed of lotus petals. The abaci are of two types: square and plain and circular and decorated and these are of different proportions. The crowning animals are masterpieces of Mauryan art, shown either seated or standing, always in the round and chiseled as a single piece with the abaci. Presumably all or most of the other columns that now lack them once had capitals and animals.

The rich tradition of the artisans has been carried forward through generations to the present day. Using the simplest of tools coupled with expertise, patience and perseverance, these artisans create works of splendour, which have few parallels anywhere in the world. Of late stone working is not only restricted to ornate carvings on temples or sculptures of deities, but also used in making items like carved panels, tiles, paper weights, pen stands, models of historical buildings, sculptures of animals and humans etc. Indian artisans now produce a blend of the modern with

ancient and are capable of reproducing music in stones. Many production units with latest stone processing technology are also operational in the country. Different types of stones like, marble, soapstone and sand stone are used by craftsmen in India. Apart from creating different articles that catch the fancy of the local people and the tourists as well, the artisans create exclusive items that are placed in the trendy house to suit the decorative purpose.

The given below research work signifies the basic properties why Chunar sandstone is best suitable for stone craft work for making heavy statues monuments etc. the research document also reflects the tendency and brittleness of sandstone which makes it for the craft task.

Study of P&S wave velocities in Chunar sandstone by **Department of mining engineering, IT BHU Varanasi published in International Journal of Earth science and engineering** pages 66-72. attachment 1 in annexure 6

The study of propagation of waves in rock mass provides information regarding the physico-mechanical properties of Chunar Sandstone. A major part of these studies are field studies used together geotechnical information about a particular area. The nature of the area has been varied, from mountain ranges to plains to sea beds. The depths upto which measurements have been carried out has also varied, from near surface to lower crustal and even upto earth's mantle. A lot of laboratory studies have also been conducted wherein rock specimens from an area have been tested to find out their physico-mechanical properties. The major work that has been done in the area has been aimed at correlating various parameters to wave velocities. These parameters are water content of rocks, temperature, pressure, fracture, direction of propagation of waves, polarization, permeability, porosity etc.

Experiments conducted to determine the directional dependence of wave velocities in two amphibolites as a function of pressure (up to 600 MPa) and temperature (up to 600°C). The velocity measurements include compressional and shear wave velocities propagating in three orthogonal directions which were in general not parallel to inherent rock symmetry axes or planes.

Comparison with measured velocities obtained for the three propagation directions that were not in accordance with the structural frame of the rocks (foliation and lineation) demonstrate that for shear waves propagating through anisotropic rocks the vibration directions are as important as the propagation directions. The study demonstrated that proper measurement of shear wave splitting by means of two orthogonal polarized sending and receiving shear wave transducers is only possible when their propagation and polarization directions are parallel and normal to foliation and lineation respectively.

The effect of pressure, temperature and density varies between different rock types. Experiments were conducted on samples of silicate and calcite⁸. Raising of pressure gave rise to velocity

increase, but the rate is different in the silicate and calcite rocks with almost linear slopes. In the silicate rocks, the intrinsic average wave velocities and Poisson's ratio exhibit a tendency for a linear increase with densities. The details of characteristics of the Chunar sand stone will found in below document. **Research document by Department of mining engineering, IT BHU Varanasi, published in International Journal of earth science and engineering.** (Pages 66-72 in annexure 6)

Qualitative differences between Sand stone and other stones – We are giving the few examples between Sand Stone and other stones in a comparative chart.

Difference Between Sandstone and Limestone

Sandstone	Limestone
<ul style="list-style-type: none"> ➤ Sandstone is also a widely found sedimentary rock. ➤ It is formed in many environments such as oceans, lakes, deserts, etc. ➤ They are mostly formed by sand grains; therefore, contain quartz and feldspar in high quantities. ➤ There can be different types of sandstones in various colors. Sandstones are used for cement or glass manufacturing. ➤ It has an aesthetic value, as well as an ornamental value. ➤ They can be cut, polished and then used as tiles or beautiful rocks for buildings or as monuments. ➤ Sandstone is not defined by any one substance. It consists of sand sized particles, which range from 0.0063 to 2mm in size. It often contains quartz, though it does not have to. Other common components of sandstone include feldspar, mica, lithic fragments and biogenic particles. ➤ Sandstone is formed from the breakdown of larger rocks due to weathering and erosion as well as from processes that occur within the rock, usually biologic but sometimes chemical in nature. 	<ul style="list-style-type: none"> ➤ Limestone is commonly found in marine environments, and they are classified as sedimentary rocks. ➤ Limestone is defined as being primarily composed of calcium carbonate, which often comes from plant and animal material such as the shells of mollusks. ➤ These are mainly formed in shallow, warm and calm waters. Biological activity also plays an important role in forming limestone. ➤ Normally, they are formed in waters where carbon dioxide concentration is low so that the sedimentation is quite easy. Marine water receives calcium from land. ➤ When these are accumulated in the form of calcite (other waste materials also tend to incorporate into this when accumulating), they are known as limestone. ➤ They are also categorized as biological sedimentary rocks. There is another type of limestone known as chemical sedimentary rocks. ➤ They are formed by direct precipitation of calcium carbonate in sea water. However, the biological sedimentary rocks are more abundant than chemical sedimentary rocks. ➤ In pure limestone, only calcite is there, but often they can contain impurities by mixing other materials like sand. So, limestone can be defined as a sedimentary rock, containing more than 50% of calcium carbonate in the form of calcite. ➤ The nature of limestone depends on how it is formed. They can be in massive sizes, crystalline, granular, etc. ➤ They are classified into several groups according to their type of formation, composition or appearance. ➤ There are many classifications too. Some of the common limestones are chalk, coquina, lithographic limestone, oolitic limestone, fossiliferous limestone, tufa, etc. There are many usages of limestone too. ➤ Since, limestone has a basic nature; it is used to neutralize acidic water bodies.

	<p>➤ Limestone often forms from whole or pieces of a variety of organisms that contain calcium carbonate, such as mollusks, echinoids and corals. Most limestone beds form in marine environments where large deposits of organisms and carbonate precipitation build up over time.</p>
Difference Between Sandstone and Shale	
Sandstone	Shale
Sandstone is made primarily of sand and has a larger grain.	Shale is made primarily from clay and has a much finer grain than sandstone.
Sandstone is sedimentary rocks, and is basic type known as classic sedimentary rocks. This type of rock is formed from the weathering of debris and not from any chemical reactions. Sandstone are common types of rocks, and same density as Shale.	Shale is also sedimentary rocks, and is basic type known as classic sedimentary rocks. This type of rock is formed from the weathering of debris and not from any chemical reactions. Shale is common types of rocks, and same density as Sandstone.
Sandstone is made of sand-sized mineral particles, most often sand. Along with the sand, there is a material in the sediment known as the matrix and also an additional material that holds all the grains together.	Shale is formed when silt and clay-sized minerals compact together over time. Shale must be composed of at least 67 percent clay. The remaining part of shale includes larger particles of silt or gravel, minerals and organic matter.
Difference between sandstone and slate Stone	
Sand Stone	Slate Stone
Sandstone is a sedimentary rocks	Slate is a metamorphic rock come from mud stone with a high temperature and pressure.
Silica is the main ingredients of sandstone	Chemically slates compose of Argil i.e Clay,
Difference between sandstone and quartzite	
Sand Stone	Quartzite
<p>Geologically, sandstone is a sedimentary rock. Sandstone contains sand-sized grains of rock fragments and individual minerals broken down from other, older rocks. Geologists also know that sand-sized grains have a particular measurement, from about 1/16th of a millimeter to 2 millimeters. The popular colors are K. Black, Brown, Tan, White, Yellow, Bansi Pink and Red, Grey.</p> <p>Sandstone is basically used for outdoor applications. Pavers, stepping stones, external wall cladding, decorative articles and statues are common application of sandstone.</p> <p>Sandstone is relatively soft and porous and appears appealing in weathered texture.</p> <p>The same test on sandstone will not lead to multiple bounces, as the softer rock will absorb the impact much quicker.</p> <p>Sandstone is more friable (less compact) and fractures along areas of looser cementation.</p> <p>Sandstone has a fairly even and coarse texture.</p>	<p>Quartzite is a metamorphic rock like marble.</p> <p>Quartzite is a rock with an identity crisis. Particularly when it is used as a building material, quartzite often gets mistaken for marble or light colored granite.</p> <p>Quartzite is preferred for interior installations. Quartzite are basically used for interior flooring, vanity tops, countertops, backsplashes, kitchen islands and even wall covering.</p> <p>Quartzite has the looks of marble, but bears properties like granite. This means it is very strong, durable, less porous and resistant to high temperature and looks amazing in glossy finishes.</p> <p>Quartzite is a much harder rock. If you let the head of a geologists pick fall on quartzite from about 15 cm the hammer will bounce several times (keep the handle of the pick loosely in your hand so it can pivot).</p> <p>Quartzite is also much finer grained. Quartzite is both a harder and more compact rock, meaning that it is less easily scratched and fractured. As a result, a quartzite sample will fracture across the grain. quartzite texture has a less even surface grain.</p>

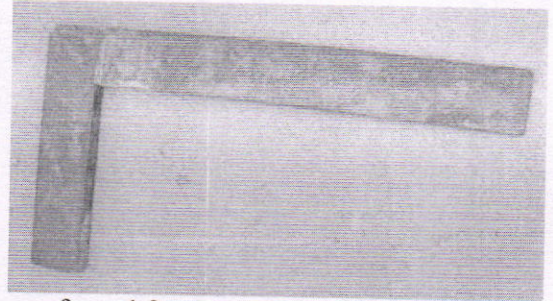
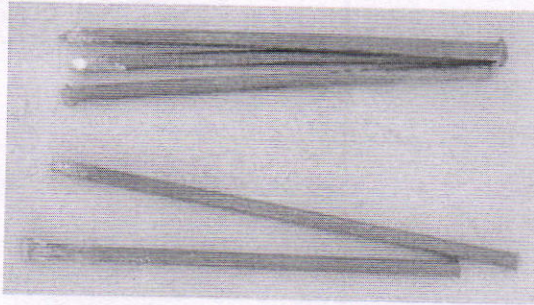
Community involved: Artisans from Schedule caste, OBC community are involved with nearly 3500 artisans.

The stone crafts of Uttar Pradesh have flourished to a great extent due to the fact that the Muslim rulers of India have patronised this craft to a great extent. The stone crafts in Uttar Pradesh reached the zenith of excellence during the Mughal period when the Taj Mahal was made.

Tools:

The stone crafts of Chunar Uttar Pradesh have shown their creative excellence through intricate architectural masterpieces. These are perfectly chiselled and are decorated with inlay work.

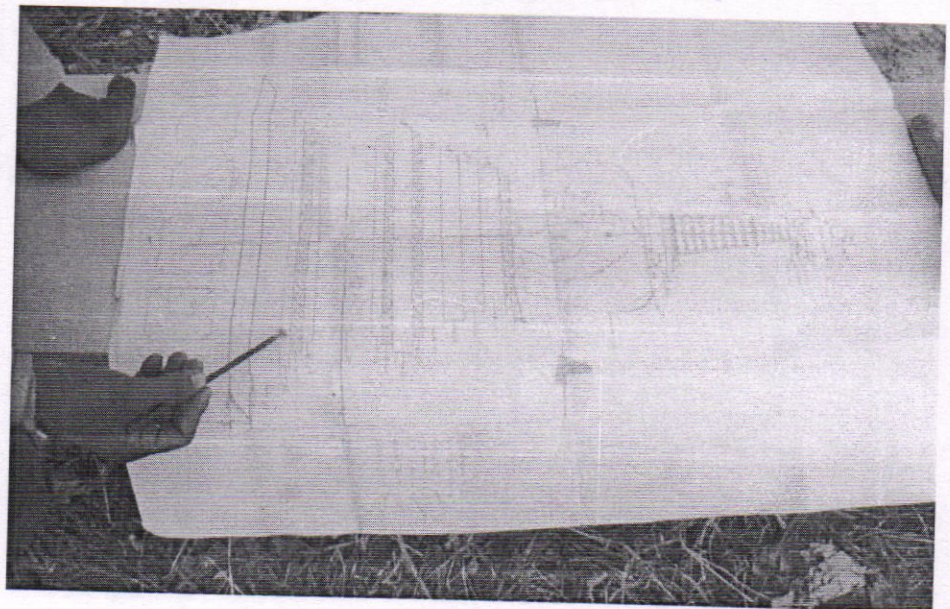
Stone carving on sandstone carry the rich cultural



heritage of royal fascination and the variety that had been explored by the artisans. These outstanding stone crafts are visible in the intricate curving on the forts and palaces. In the 3rd century B.C., the imperial court of Ashoka provided a great boost to the art of stone carving. The excavations

found in Mathura and Agra areas verify that the red sandstone of Chunar has been lavishly used in the stone sculptures. The statues of religious gods and goddesses with excellent carving, brilliantly created articles of inlay work, stone carvings with embedded inexpensive shells or semi precious stones are some of the well known stone crafts that are admired in all around the country. The famous among the stone crafts of Uttar Pradesh is the mosaic work of Taj Mahal and Fatehpur Sikri.

Design



The base material of sand stone craft in Chunar Uttar Pradesh is, sandstone. The artisans sometimes use country made machines for cutting, grinding, buffing and polishing of stone. In some places the craftsmen still use chisel and hammer to bring out curved patterns and designs followed by grinding and polishing. The artisans are called Sadakars and Pachikars. The Sadakars create cutting and carving by machines and the Pachikars create carvings with the chisels.

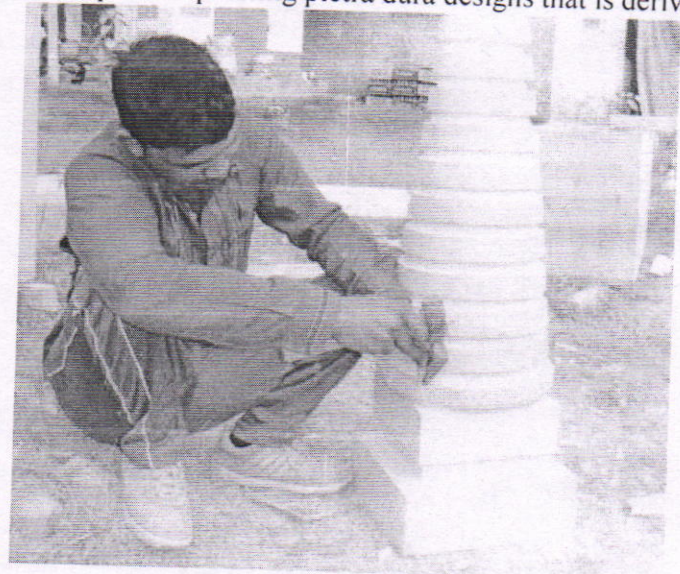


Chunar is the place where the great examples of stone craft have been seen. Stone crafts of Uttar Pradesh stand as the epitome of strength and beauty. The designs are either foliage or floral intertwined with geometrical patterns. The items like vases, boxes, lamps, plates, bowls and pitchers are created with delicately moulded shapes and fine carvings. Intricate friezes and trellis or jali work done in an eye-catching range of patterns is also specialty of Chunar



The stone craft of Chunar include marble boxes, wall plates, table tops, coasters, and ashtrays inlaid with semi-precious stones and mother of pearl in pleasing pietra dura designs that is derived from the Mughal monuments and paintings. Even the Sandstone stone carvings, paperweights, and Rubic cube like candleholders, which take four different sizes, are considered as the intricate craftsmanship of the artisans of Chunar Uttar Pradesh.

Apart from creating different articles that catch the fancy of the local people and the tourists as well, the artisans create exclusive items that are placed in the trendy house to suit the decorative purpose.



Tools: Hammer, Chisel, Pointed chisel, Sandpapers, safety glasses, dust mask and hearing protectors, raffle.