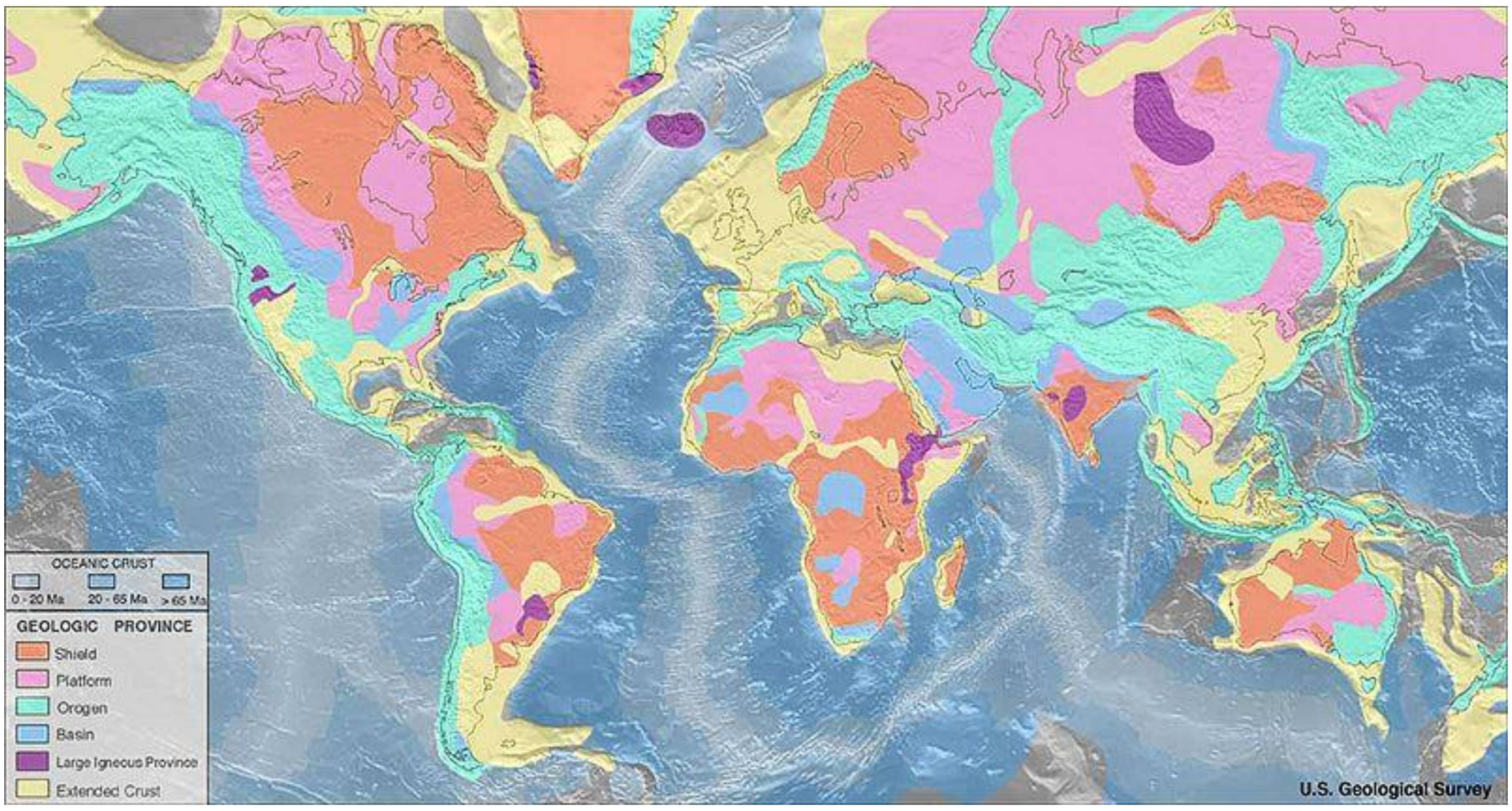
New Ice Age Ahead

Basalt

Key to the Ice Age Revolution

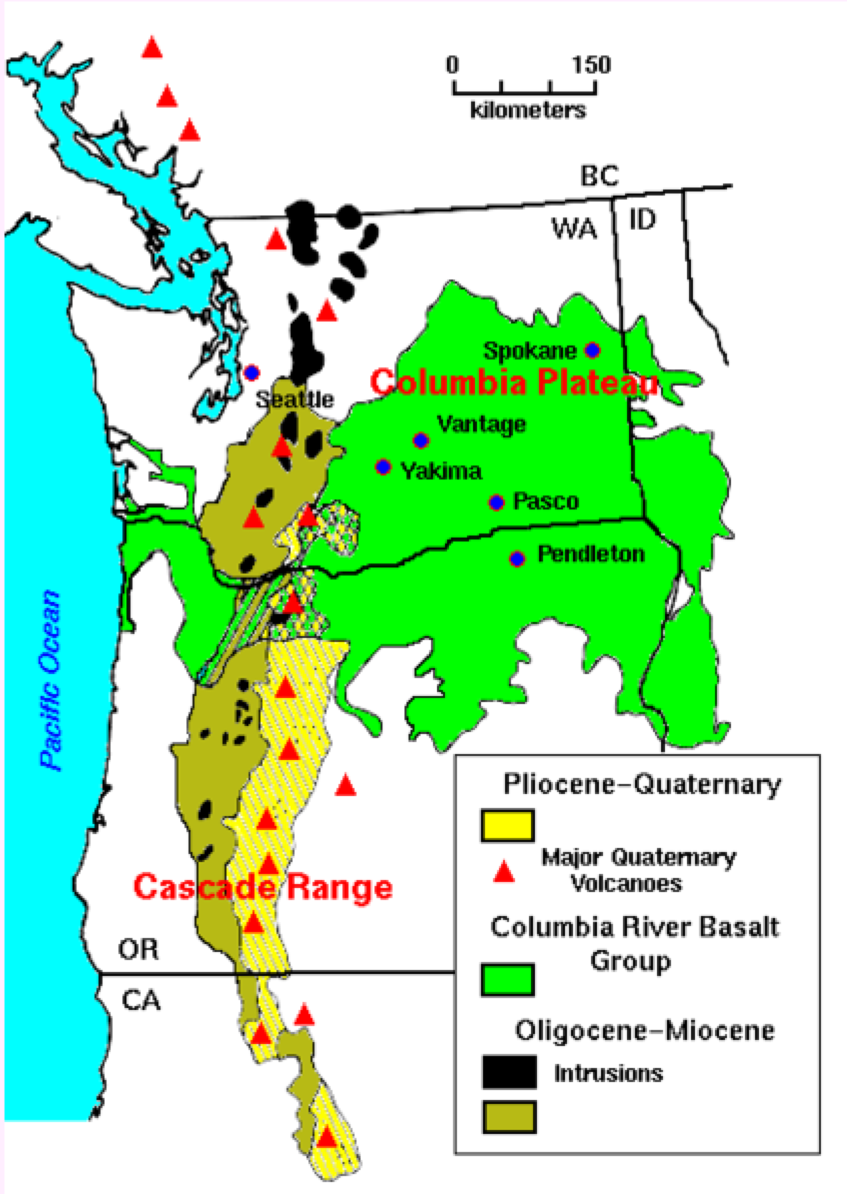


The flood basalt (dark purple), as huge as it is in North America, is small in global terms

With new materials that exist plentifully, the traditional limits to development fall away.

The key for the new basalt technology lies here, in the Great Sandy Desert of the Harney Basin of Oregon. The entire area seen above is but a small part of the Columbia River Flood Basalt Province.

I see in this scene above the potential heart of the greatest industrial and technological revolution in American history. Beneath the sand and in the mountains in the distance, and in those behind them, unseen by the eye, lies a vast store of basalt that is one of the largest flood basalt deposits ever created on the Earth's surface, though it is small in global terms. It extends across the states of Washington, Idaho, Oregon, and trailing south into California.



Columbia and Snake River Flood Basalt Province

The Columbia and Snake River Flood Basalt Province extends across 163,700 km^2 (63,000 $mile^2$) of the Pacific Northwest with stores of basalt that are up to 6000 feet deep and contain an estimated volume of 174,300 cubic kilometers. The basalt was laid down 17-14 million years ago in a volcanic flooding event. Basalt exists in large quantities in the mantle of the earth, but only in a few places do they appear on the surface, as in the flood basalt province above.

Basalt is a stone, basically. But what a stone it is! It has amazing properties. It is nearly as hard as diamonds, melts at 'low' temperatures (slightly lower than molten glass), and when extruded into the fibers it is one of the strongest materials known, second only to carbon fibers. Just compare the tenacity (strength) numbers (given in MPa - mega Pascal; 1 Pa=1kg/square meter). The numbers are, for structural steel=400, titanium=830, the best glass fiber=4,710, basalt fiber=4,870, carbon fiber=5,650. While being 12 times stronger than steel in this comparison, basalt is nearly three times lighter. These amazing qualities of basalt, altogether, enable equally amazing technological capabilities for industrial processes.

The reason why basalt is not yet widely used, is society's reluctance to use its vast nuclear power resources, and also provide itself the needed space to set up the corresponding industrial capability that utilizes the new material. In comparison, it takes twice as much energy to melt basalt than it takes to melt steel. However, in the nuclear age, energy is no longer a big factor, especially in heat-based processing where the theoretical energy factor is near zero, as the heat invested can be largely recovered in the cooling process.

For example: It takes 200 kilo-calories to raise the temperature of a ton of basalt one degree Centigrade, termed specific heat. This adds up to 280,000 kilo-calories of heat needed to raise a ton of basalt to the process temperature of 1,400 degrees. This heat volume, by conversion, equates to 325 Kw/hrs. This is the thermal energy needed to process one ton of basalt. On the basis of this facts, a 1 gigawatt nuclear reactor would be able to process 3,000 tons of basalt per hour. However, the heat that gets put into the process of melting the basalt, can be recovered after forming the product, being reclaimed during the cooling of the product. Typically the recovered heat would be applied to preheating the feed stock. If only half of the process heat would be recovered that way, a single one gigawatt plant would be able to process twice as much material, or 6,000 tons per hour. In practice far greater efficiencies are achievable. If the process was designed so that 90% of the input heat can be recovered from the cooling process, a single 1 GW plant would be able to process 27,000 tons of basalt per hour, which adds up to 23 million tons per year. This is more than double the output in tonnage of a large-scale steel mill, and is four times greater in volume.

With the current world-capacity in steel production standing at roughly 1.5 billion tons, it would take a mere 55 production units to match the current world-capacity. However, with the structural strength of basalt being ten times greater, a mere 6 production units would be able to produce the equivalent of the entire world-supply of structural steel products.

The above analysis isn't intended to suggest that steel production would be displaced, but it illustrates the enormous potential of the basalt process for revolutionizing the economic platform of the world. In real terms, basalt would be used for products where steel is not even considered due to its presently high production cost (in the absence of high-temperature nuclear power).

Steel production is not cheap. Steel production is a complex, multi-stage process from mining both the ore and the coal for melting it, involving secondary industries for ore processing, coke making, steel smelting, and so on, till the end-stage of the milled product is reached.

Let me give you a comparison between steel making, and basalt making.

The steel making process typically begins with the mining of hematite or magnetite containing rock formations. The mined product is then crushed and ground into a powder that enables magnetic separation. The result, after the tailings (60%-75%) are removed, is a concentrate that contains 60% of iron, the typical feed stock for the smelting processes. In order to produce one ton of iron, one typically needs a mix of 1 ¾ tons of the concentrate (ore), ¾ ton of charcoal or coke, and ¼ ton of limestone. Typically furnaces stand 30 feet tall. Traditionally the materials were placed in the furnace in layers. The first layer was charcoal, the next layer limestone, followed by the iron ore. Stoked in this manner the furnace burned by natural draft. Now forced air is used, in blast furnaces, and the charge (fuel and ore etc.) is continuously supplied. The coke burns at an extremely high temperature by which the iron in the ore melts. In the process a small amount of the carbon is absorbed. The limestone combines with the impurities to form a waste material called, slag. The resulting product is called "pig iron" that is used for secondary manufacturing. The Coke that powers the modern process is derived from destructive distillation of low-ash, low-sulfur bituminous coal. The coke making involves a high temperature process (typically 1100°C) in an oxygen deficient atmosphere that concentrates the carbon. Coke making is a separate industry attached to the steel industry. In steel making, typically 4 tons of air is required, per ton of steel, which is either vented directly, or cleaned before venting.

The basalt making process is simpler. Here 100% of the quarried material is used (no tailings result). The quarried material is process ready (no pre-processing is required). The process is non-polluting (no ash or slag are produced). The end product is derived in a one-step process. The difference between steel making and basalt processing appears to be of the same order of magnitude as the difference between flying from San Francisco to Los Angeles via Tokyo, and taking the LA shuttle.

The above comparison illustrates the inherent cost differential between steel making and the nuclear-powered basalt processing, which opens up a whole world of applications with many types of manufacturing not yet imagined. It certainly wouldn't make steel production obsolete. Steel has many valuable qualities. But the potential efficiency in basalt processing will likely result in many more, and more efficient options, for achieving a certain industrial product objective.

Infrastructures for the human dimension

For the automated production of housing, for example, extruded multi-layer corrugated wall units and floor units, of multiple types and shapes, etc. could be produced in single-step processes, for an assembly-ready product that is requiring little or no post-processing, which would also be light in weight for easy transportation.

Consider the following: For construction, the strength of steel is 10 times greater than wood, and that of basalt it 10 times greater than steel, and with a third of the weight of steel. The resulting advantage could totally revolutionize housing across the world, and this so rapidly that the self-perception of society itself would change.

Quality housing is one of the basic infrastructures for human development. The commitment by society to providing itself this infrastructure for free on as universal a platform as possible, would be nothing less than a commitment by society to empower with technology-infrastructures the advanced self-development of its noosphere on which all aspects of development in the world depend. This intelligently directed intervention would provide for the noosphere an advanced platform for the further development of its creative power that it might not be able to achieve without this infrastructure.

While infrastructures are basically physical (even education has a physical component), their effects can however be shaped in such a manner that they uplift the entire sphere of life, including the biosphere, and above all the noosphere, and create a New World with a new renaissance in the process, such as has never been seen before. Advanced technology enables the needed infrastructures to be created.

There are three 'levels' of infrastructures possible. One type, for example, takes water from a water-rich area to a dry area to enable the expansion of the biosphere. This is a basic type that does not alter the biosphere, but merely expands it into previously unproductive areas. The second type, is a higher-order type of infrastructure. It is one that raises the dynamic power of the biosphere itself, to levels of productivity and creativity that the biosphere would not be able to attain without these manmade infrastructures since the conditions required for this type of improvement do not exist naturally on this planet, which can only be created by human action. Indoor agriculture falls into this category.

The third type of infrastructure is of a still higher order by virtue of its intention to create the same advanced conditions that would empower the biosphere to enable equivalent improvements in the noosphere - the arena of human congnition and creative expression. With the provision of free high-quality housing the noosphere would become empowered to attain a 'density' of self-improvement at a rate that is not statistically predictable as historic limits would then be removed across the board of society that would enable conditions that have not previously been achieved. We saw a bit of this dynamic unfolding during the Golden Renaissance, which was rapidly torn down with the infusion of imperial insanity before the noospheric development had reached a critical breakout point where it would have reached the needed stability.

In the modern world the noosphere is rapidly collapsing, which is evident in the collapsing physical productivity around the world and in the general conditions of life. An economic recovery will likely not be possible without an intense response to reversing the collapse in the noosphere. It simply won't be possible to create a nuclear powered world with scientifically enriched agriculture and space-faring technology, while ever-greater portions of society live under bridges, or in slum conditions, or are choked to death by rent-slavery. At the current stage where the economic collapse has become critical and a recovery is urgently needed the focus has to be on the foundation, the noospheric improvement that creates the conditions for creative economic development. Fortunately this improvement is not difficult to achieve. The power resources and the needed materials all exist in abundance for creating the needed basic infrastructures, including the physical space for a jumpstart development, which likewise exists in abundance, and of course the technologies do exist as well. All that stands in the way at the preset time is the 'hump' of the currently prevailing 'intense' smallness in thinking that society needs to get accross. No physical limits stand in the way.

Presently a 2,000 sqft wood-frame house weighs roughly 50 tons. If this weight was reduced to only 10 tons with the use of high-strength modules, which should be achievable with basalt, a single 1 GW basalt processing plant should, on this platform, be able to produce the modular components for 2,700 houses in one hour. Even if this theoretical capacity cannot be achieved, the automated manufacturing of 2,000 houses an hour (17 million houses a year) from a single facility, would go a long way in changing the living environment of society.

Factors in development dynamics

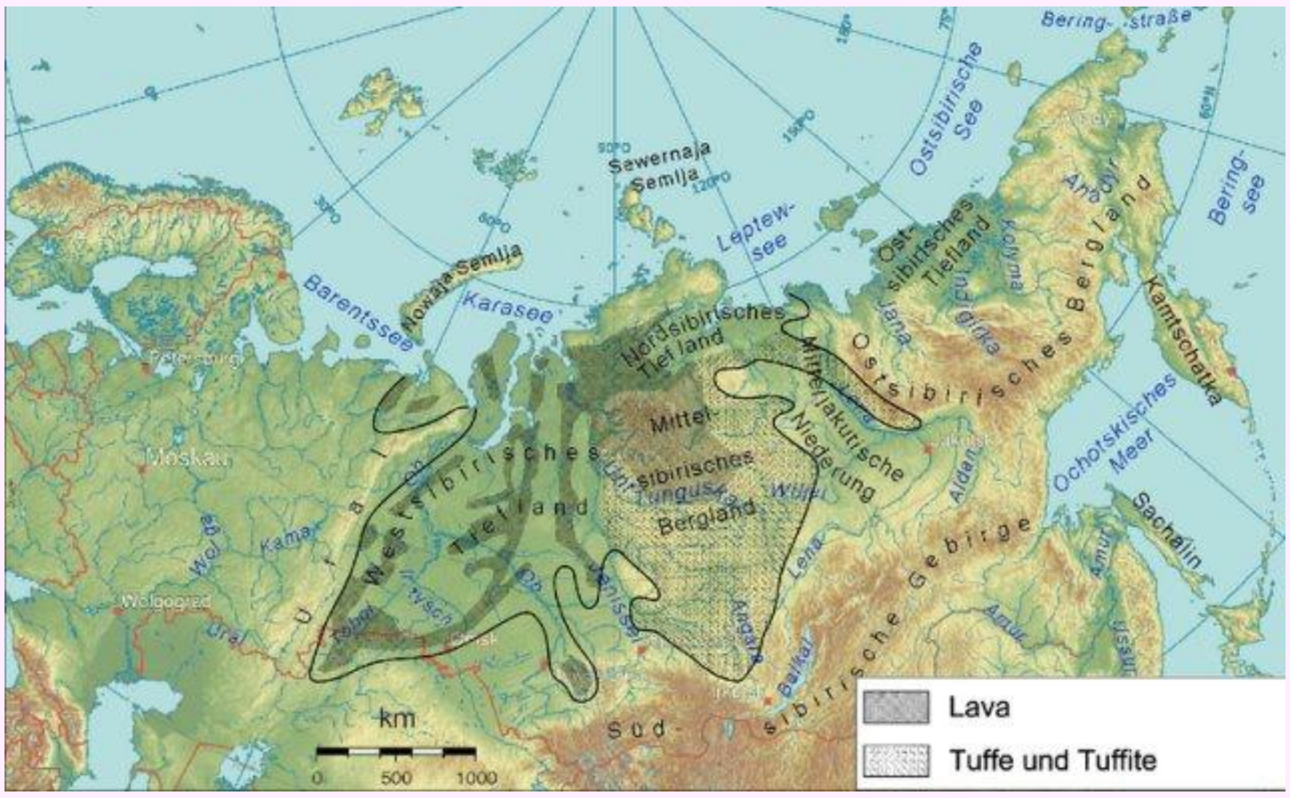
The dynamics for achieving a critical breakthrough in all types of development appears to be determined by two critical factors. One of these is the factor of 'task density.' The greater the task is, the more likely it will be tackled. And the second factor may be termed 'task quality.' The term quality in this case relates a quality of objectives that inspire the greatest possible cultural optimism (such as getting from Frisco to LA in an hour at a cost so low that you can afford to go there for an afternoon tea or a concert performance. The NASA moon-landing project was strong in both factors. That is likely why it succeeded. Kenney said that we must do it, because it is hard, and society was inspired by what the human being can accomplish. It still inspires people just to look back at what was accomplished in crossing the countless hurdles along the way. Just look at what we did.

The current lack of optimism is groundless

There is no reason why society should not use the great volumes of energy and advanced materials that lay abundantly on the ground, and built itself a future with them.

In terms of energy resources, the USA, all by itself, has more than 900,000 tons of thorium available to it, enough to power a thousand 1 GW reactor systems for 900 years. Of course long before this will ever be used up, the vast electric power streams that power the sun, which an inexhaustible resource, will also become accessible to us.

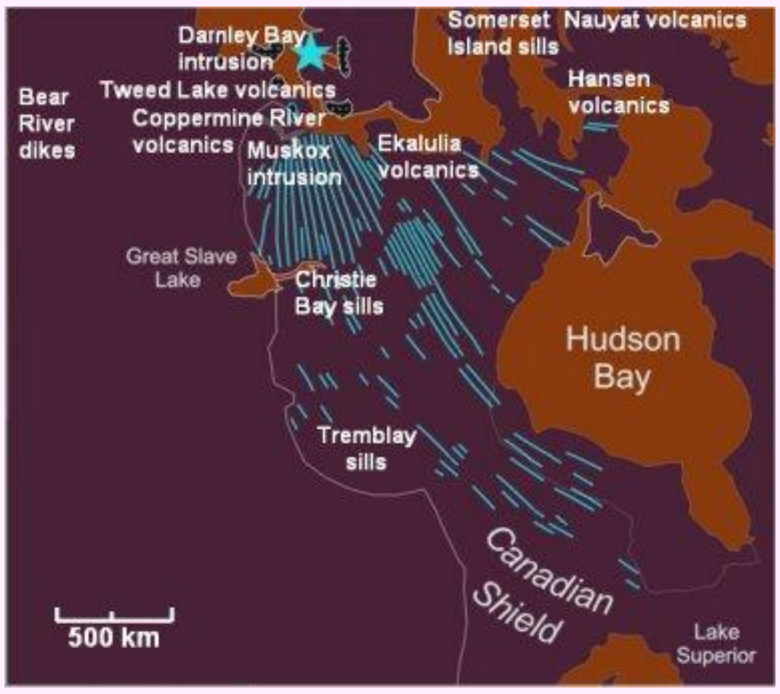
And for basalt, the scene looks even richer. The Columbia River Flood Basalt province may be huge in size and volume, extending across several states, but in global terms this province barely make it to third place. Russia has a far bigger deposit available to it, the biggest of them all, the giant Siberian Traps that extend from the Ural mountains all the way east to the Lena River and from the arctic ocean in the north all the way south, almost to Lake Baikal.



[Siberian Traps flood basalt province]

The Siberian Traps extend across 2 million square kilometers – an area roughly equal to all of western Europe. The basalt volume there is estimated to range from 1 to 4 million cubic kilometers. All of this is 100% usable high-grade industrial material. Are we still thinking small?

The second-largest flood basalt province is located in the Northwest Territory of Canada, named the [Mackenzie Large Igneous Province].



[Mackenzie Large Igneous Province]

It exists as a 'swarm' of deposits that occupies an area of at least 2,700,000 square kilometers, containing a basalt volume of 650,000 cubic kilometers. Its enormous expanse makes the Mackenzie Large Igneous Province larger in area than the entire U.S. State of Alaska., and also larger in volume than the famous [Deccan Traps] in west-central India that consist of multiple layers of solidified flood basalt that together are more than 6,000 ft thick in some places and cover an area of 500,000 sq km (193,051 sq mi). The Deccan Traps contain a basalt volume of 512,000 cubic kilometers (123,000 cu mi). The term 'traps' in the name is derived from the Dutch word for stairs. There is enough basalt in these provinces to cover the entire land area of the Earth 50 to 120 feet deep, depending on the estimates. This is more than ever be used. So, why shouldn't we start using the best that we have to built our new world with?

Is there anything more that we need, in terms of high-grade construction material than what presently sits unused on the ground? Are we having hope yet?

The present uses:

Cast Basalt floor tiles are a material with decorative appeal and exceptional physical performance characteristics. It is one of the hardest ceramic materials known. They are selected for two key reasons: unique aesthetics and high performance.

Basalt tile is excellent in Pharmaceutical Labs, Auto Showrooms, and Shop areas. Basalt is oil and grease resistant and will not create dust. Basalt has zero absorption, will not stain or scratch and requires little or no maintenance. Basalt has NO CHEMICALS and is ENVIRONMENTAL SAFE.

http://www.decorativebasalt.com/

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http://bspmat.com.previewyoursite.com/ documents/Techtextil+2002+Basalt+paper1.pdf

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Construction

SUPERIOR ALTERNATIVE TO CONVENTIONAL STEEL REBAR

Rods made of a unidirectional composite of basalt fibers offer significant advantages over steel rebar in a variety of applications.

• Higher specific strength than steel rebar

• 89% lighter in weight: one ton of basalt reinforcement rods provides the reinforcement of 9.6 tons of steel rebar.

http://www.sudaglass.com/rods.html

Kamenny Vek manufactures highly qualitative basalt continuous fibers.

Our basalt fibers show 15-20% higher tensile strength and modulus, better chemical resistance, extended operating temperature range, better environmental friendliness than regular E glass - all in one material - getting close to and sometime outperforming high strength glass and other specialty fibers but beating them price wise. Our basalt continuous fibers are ideally suited for demanding applications requiring high temperatures, chemical resistance, durability, mechanical strength and low water absorption.

• Structural: ◦ Linoleum base ◦ Roofing ◦ Separating elements ◦ Construction material	• Composite: ◦ Accumulators ◦ Hydrophobic mould layer	• Transport and motor-car construction: ◦ Spare parts ◦ Containers ◦ Tanks ◦ Choke tubes ◦ Car body and interior	• Marine: ◦ Boats ◦ Yachts

Manufacture

The manufacture basalt fiber requires the melting of the quarried basalt rock to about 1,400°C. The molten rock is then extruded through small nozzles to produce continuous filaments of basalt fiber. There are three main manufacturing techniques, which are centrifugal-blowing, centrifugal-multiroll and die-blowing. The fibers typically have a filament diameter of between 9 and 13 µm which is far enough above the respiratory limit of 5 µm to make basalt fiber a suitable replacement for asbestos.

History

The first attempts to produce basalt fiber date to 1923 in the United States of America. These were further developed after World War II by researchers in the USA, Europe and the Soviet Union especially for military and aerospace applications. Since declassification in 1995 basalt fibers have been used in a wider range of civilian applications.

See: http://en.wikipedia.org/wiki/Basalt_fiber

Free houses by the millions

Basalt without limits

Glass Steagall and Industrial Revolution

The real and false Principle of Economics

The story of the Horse Rancher

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