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**THE BOGGULAKONDA GABBROS OF PRAKASAM ALKALINE PROVINCE,**  
**ANDHRA PRADESH, INDIA: ENTREPRENEURSHIP OPPORTUNITIES IN CIVIL**  
**ENGINEERING ARENA**

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### ABSTRACT

Gabbros are plutonic igneous rocks formed at greater depths in the crust of the earth by slow cooling of basalt magma. Gabbro is closely associated with troctolite, norite and anorthosite in the field as they are genetically related to a common basalt parental magma. They occur as large hills, small hillocks, ground level out crops in the field. When gabbros and granites are exposed to weathering, gabbros weather faster than the granite because of high temperature of formation of gabbros. Gabbro is dense and relatively heavy and gives metallic sound when beaten with geological hammer; it is mesocratic to melanocratic in colour and coarse grained with grain size ranging from 1 mm to 10 mm and is usually equigranular in texture. Gabbro consists of clinopyroxene and plagioclase as essential minerals ( $\pm$  minor orthopyroxene, amphibole and olivine). The clinopyroxene is augite and plagioclase is of labradorite. Gabbro grades into norite with increase of orthopyroxene content. Crushed gabbro is used as a base material in construction and road construction. It is also used to make a number of rough-cut products such as curbing, ashlars, paving stones and other products. Brightly polish gabbro is used to make cemetery markers, kitchen counter tops, floor tiles, facing stone and other dimension stone products. Gabbros are popularly known as black granites. The gabbroic plutons of Prakasam alkaline rock province in Andhra Pradesh are emplaced within the Precambrian amphibolite and granite gneiss and their emplacement is tectonically controlled. Boggulakonda is one area in the Prakasam District that is occupied by gabbroic rocks. The Prakasam alkaline province in Andhra Pradesh promises ample entrepreneurship opportunities as it is composed of several gabbroic intrusions such as at Boggulakonda and Chimakurthi. Elsewhere, gabbroic intrusions such as those of Boggulakonda and Chimakurthi with substantial ultramafic components have proved to be repositories of platinum group of elements (PGE), Cu, Ni, Cr, Co etc. The gabbroic rocks provide suitable properties that support decorative and building construction practices and management.

**Keywords:** *Gabbro, Prakasam Alkaline Province, Decorative stone, Construction materials.*

### I. INTRODUCTION

Gabbroic rocks are abundantly using as a construction materials in civil engineering projects. The Boggulakonda gabbroic pluton is situated (E 80°00'30", N 15°44'04") in Prakasam Alkaline Province (PAP). Gabbroic pluton of Boggulakonda is formed within the Precambrian amphibolite and granite gneiss and their emplacement is tectonically controlled. In general, gabbroic rocks are commercially known as black granite (Bronzite of gabbro of Chimmakurthy is commercially known as galaxy granite). Gabbro has many uses such as crushed material is used as aggregates in building and road construction works. Fine material of the gabbroic rock obtained at the time of crushing is also used as sand and smoothly polished slabs are being used for flooring and cladding. The gabbro plutons of Boggulakonda, Settupalle, Purimetia, Pasupugallu and Chimakurthi in the Prakasam alkaline province (PAP) in Andhra Pradesh [1, 2] occur in a narrow zone (east of the Cuddapah basin) within the Precambrian amphibolites and granitic gneisses.

The Boggulakonda gabbroic pluton of Prakasam Alkaline Province, Prakasam District, Andhra Pradesh promises great entrepreneurship opportunities especially in civil engineering domain.

## II. GABBROIC ROCKS

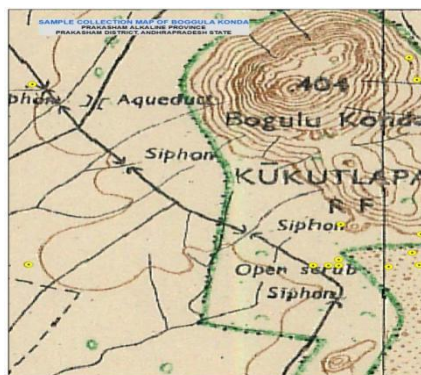
Gabbro is a black or dark green coloured, melanocratic, intrusive igneous rock. Generally it is a coarse grained rock and consists of augite and plagioclase. The Prakasam alkaline province (PAP) is a Proterozoic intra-plate, sub-alkaline and alkaline igneous province in the Prakasam district of Andhra Pradesh [3, 4].

## III. ROCKS AND MINERALS OF GABBROIC PLUTON OF BOGGULAKONDA, PAP

The PAP is composed chiefly of gabbro plutons (sub-alkaline) and syenite and granite intrusive (alkaline or calc-alkaline). The available Rb-Sr isotopic ages of the alkaline complexes of PAP range from 1369 to 1098 Million years (Ma). It is considered that the basic magmatism has predated the alkaline magmatism [5].

*Table:1 Important rocks and minerals of gabbroic pluton of Boggulakonda*

Essential minerals	Minor minerals	Accessory minerals	Rocks Types
Clinopyroxene + plagioclase ± (olivine, orthopyroxene).	Amphibole ± biotite	Opagues, apatite, sphene, calcite, spinel, scapolite.	olivine gabbro, norite, gabbro Norite, leucogabbro and anorthosite



*Fig.1. Study area map of gabbroic pluton of Boggulakonda, PAP.*

## IV. ECONOMIC IMPORTANCE OF GABBROIC PLUTON OF BOGGULAKONDA

Gabbros of Boggulakonda and Chimakurthi mainly consist of platinum group of elements (PGE), Cu, Ni, Cr, Co etc, which are of great economic importance. And also these gabbroic rocks used abundantly in construction industry for various aspects such as ashlar, paving stones, aggregates, manufactured sand, cemetery markers, kitchen counter tops, floor tiles, facing stone and other dimension stone products.

## V. GABBROIC PLUTON OF BOGGULAKONDA; A GREAT SOURCE OF ENTREPRENEURSHIP OPPORTUNITIES

The Prakasam alkaline province in Andhra Pradesh, a great source to create many entrepreneurship opportunities especially in civil engineering arena. There are many possibilities towards entrepreneurship opportunities in both manufacturing, trading and service sectors. To foster entrepreneurial spirit amongst the technically qualified graduates & Post-graduates from the faculties of Civil Engineering. It teaches the basic and foundational skills needed to start their own business related to materials used in building construction practices.

Boggulakonda gabbroic pluton is a great source to establish business related to stone crushers, cutting and polishing units.



## VI. FROM CIVIL ENGINEER TO ENTREPRENEUR

The construction industry is singlehandedly responsible for the enhancement of infrastructures worldwide. A country or city's development can be linked to the role civil engineers play in terms of construction of sky scrapers, shopping malls, office complexes and a host of others.

If you are a civil engineer and would love to dabble into business, the following are the best business ideas you can select from.

There is a lot opportunities for civil engineers as infrastructure will always need to be designed, built and maintained. There are cities being planned and slated for creation in the coming decades. The potential is vast and need to specialize in something that can really help to grasp the opportunity and grab a piece in this gigantic pie. For an Entrepreneur/Startup, low cost housing , Interior furniture's at affordable cost, Property Management Services will have good market. Generally, civil engineering being more conventional, traditional businesses will have its long run as such like contract works, BOT,PWD works, real estate promotions.

*Table: 2.The best small business ideas for civil engineers in various sectors*

<b>Manufacturing Sector</b>	<b>Trading Sector</b>	<b>Service Sector</b>
Construction	Construction equipment	Gathers Rental
Cement Plant	Sand and Gravel	Bricklaying services
Bricks and Blocks	Selling Cement	Construction site cleaning
Roofing Materials	Wiring business	Fixing POP, Gates,Doors
Nails production	Granites, Tiles & Marbles	Interlocking slabs and Tiles
Granites, Tiles & Marbles	Gates,Doors and Windows	Granites,Tiles,Marble laying
Gates,Doors and Windows	Safety Gadgets	Electrical Wiring,
Aluminium Production	Aluminium Sales	Burglary Fixing
Furniture	Furniture sales	Borehole Drilling

## VII. THE ANATOMY OF AN ENTREPRENEUR

The success of an entrepreneur – and a business – is usually down to few unique character traits. Some say entrepreneurs are born, but we believe if you have passion and drive to pursue your business idea, then you can learn from the very best entrepreneurs to follow in their footsteps.

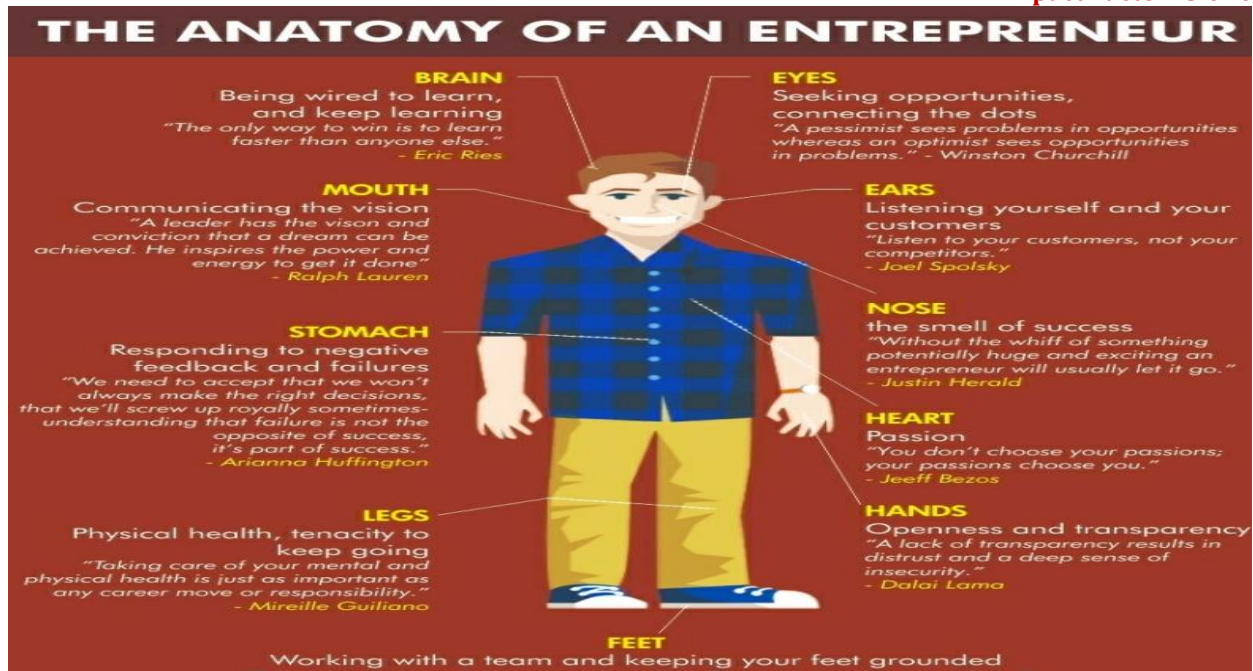


Fig.2. The Anatomy of an Entrepreneur.

## VIII. RECOMMENDATIONS AND CONCLUSIONS

Gabbroic rocks of Boggulakonda pluton of Prakasam Alkaline Province, are much useful in construction industry. Hence, there are many possibilities in order to establish enterprises related to civil engineering area especially in manufacturing and trading sectors.

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