Introduction to Infrastructural Engineering

Construction Materials7

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Aggregate physical properties

- **Particle shape and surface texture**. Particle shape and surface texture are important for proper compaction, load resistance and workability. Generally, cubic angular-shaped particles with a rough surface texture are best.
- **Specific gravity**. Aggregate specific gravity is useful in making weight-volume conversions and in calculating the void content in compacted Hot Mixed Asphalt
- **Cleanliness and deleterious materials**. Aggregates must be relatively clean when used in HMA. Vegetation, soft particles, clay lumps, excess dust and vegetable matter may affect performance by quickly degrading, which causes a loss of structural support and/or prevents binder-aggregate bonding

Gypsum

- Occurs in nature as :
  - flattened
  - often twinned crystals
  - transparent cleavable masses called selenite.
- May also occur in a silky, fibrous form, in which case it is commonly called satin spar.
- Finally may also be granular or quite compact.
- In hand-sized samples.
- Can be transparent or opaque.

http://www.warmtec.co.nz/mediac/400_0/media/variotherm3.JPG

Occurrence gypsum

- A common mineral, with thick and extensive evaporite beds in association with sedimentary rocks.
- Gypsum is deposited in lake and sea water.
- Hydrothermal anhydrite in veins is commonly hydrated to gypsum by groundwater in near surface exposures.
- Often associated with the minerals halite and sulfur.

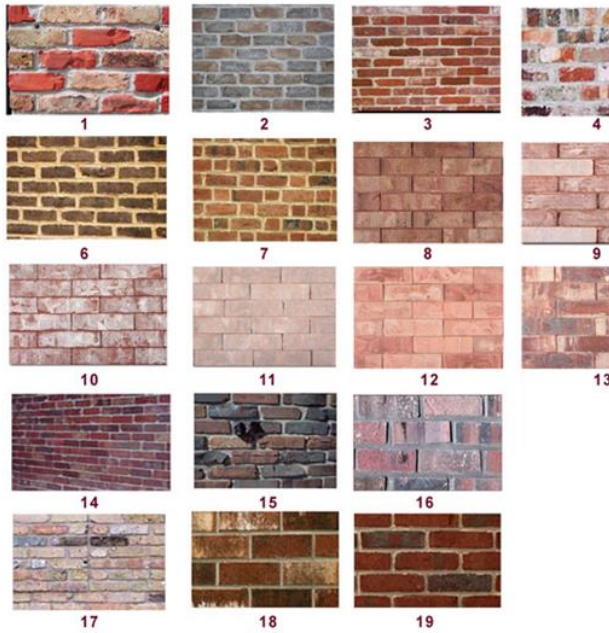
http://en.wikipedia.org/wiki/Gypsum

Uses of gypsum

- Gypsum Board primarily used as a finish for walls and ceilings; known in construction slang as Drywall
- Plaster ingredient.
- A component of Portland cement used to prevent flash setting of concrete.

Brıck

- Masonry unit
- Does not infer any particular material
- About %90 of UK, bricks made from some form of clay.
- %8 of UK bricks made of concrete crushed rock aggregate and portland cement are main constituents.
- %3 of UK of brick made from sand and lime, sometimes with the addition of crushed flint.



http://www.urbanrevivals.com/images/brick/brick_all_

Types of brick

- **Common unit** - suitable for general construction,with no special claim to give an attractive appereance.
- **Facing unit** - speacilly made or selected to give an attractive appearance
- **Header-** shorter face of a masonry unit showing on the face of a wall
- **Brick-** not exceeding 338 mm in lenght,225mm in width,nor 113 mm in height.

http://www.legacy-research.com/pages/files/justicectr/wellbricks.JPG

Types of brick

- **Engineering brick**- fired clay brick,having a dense and strong semi-vitreous body,conforming to defined limits for water absorbtion and compressive strength
- **Frogged brick-**Frogs not exceeding %20 of gross volume
- **Soft mud bricks-** most economical.burned at 900-1000 C to achieve strenght.
- **Dry pressed bricks-**more accurate,sharper-edged bricks

Types of brıck

- **Extruded bricks-**hard dense,lighter,easier to handle,different thermal properties from solid bricks.make hardened by drying 20-40 hours at 50-150 C before being fired.
- **Calcium silicate bricks-**consist of lime,mixed with quartz , crushed flint or crushed siliceous rock with mineral colourants. Bricks are accurate ,uniform, various colors(white is common)

Uses of brick

- In metalurgy industry , glass industry for lining furnaces.
- Use as a refractory (silica, magnesia bricks)
- To make walls,barbeques,fences etc..