ALLUVIAL VERSUS HARD ROCK QUARRIES

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TOPICS

- Rock Properties
- Specifications
- Plant Layouts
- Crushing Process
- Washing
- Conveying



ROCK PROPERTIES

Rock Properties

- Properties vary considerably and need to be fully understood
- Alluvial deposits may consist of a number of different rock types
- Contaminates may also effect material performance
- For example,
 - Schist
 - Shale
 - Sand stone
 - Pumice
 - Lignite
 - Wood
- If these contaminates are present we need to design the process to remove them

Material Hardness and Abrasion

• Hardness variation in hard rock quarries needs to be considered. Locations in quarry may be targeted for different product requirements



SPECIFICATIONS

Specifications

- TNZ M/4
- TNZ M/6
- GAP

Fractured Faces

- Sealing Chip 98% two broken faces
- M4 Base Coarse 70% two broken faces (37.5 – 4.75mm sieves)

Cleanness

Sand Equivalent

Clay Index

Plasticity Index



PLANT LAYOUT (ALLUVIAL)

PLANT LAYOUT (HARD ROCK)



MOBILE PLANTS



PLANT LAYOUT

Alluvial

- Scalping required to separate natural rounds for concrete aggregate prior to crushing of oversize
- Scalping also necessary to remove excess fractions for base coarse
- Concrete aggregate washed and separated into various size fractions
- Natural sands washed to remove <100 micron particles and organic contaminates
- Oversize (typically >20 or 40mm) crushed to produce asphalt aggregates and seal chip
- Base coarse produced with fixed or mobile plants

Hardrock

- Material handling to handle large rock size. Typically 600

 700mm minus
- Scalping required to remove low grade rock and clays
- Primary crushing with jaw or impact crushers to reduce size down for proceeding stage
- Plants can consist of up to four stages of crushing
- Aggregates washed to obtain cleanliness standards
- Sand can or cannot be washed depending on material properties



CRUSHERS

- Crusher types
 - Jaw crushers
 - Cone crushers
 - Impact crusher
 - VSI crusher
- Primary / secondary cone crushers in alluvial deposits
- New technology being introduced for fine crushing

AGGREGATE WASHING PROCESS

- Sands are washed to remove ultra fines (<100 micron), produce specification gradations and remove organic contaminates
- Washing process can consist of,
 - Washing screens
 - Classifying tanks
 - Sand screws
 - Dewatering screws
 - Cyclones
 - Cyclone / dewatering screens



AGGREGATE WASHING PROCESS

- Aggregates are washed to remove organic contaminates as well as ultra fines generated during the crushing process
- Washing process can consist of,
 - Coarse material washers
 - Blade mills
 - Log washers
 - Trommel screens
 - Scrubber barrels



CONVEYING

- The geographical nature of alluvial deposits lead to conveying system for transportation of materials
- Common to see overland conveying systems with loader extraction at the pit face
- Plants typically more spread out with the use of product stacking conveyors



THANK YOU

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