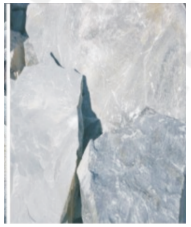
Limestone Feed Assessment Before Crusher Selection

Crusher selection starts with the condition of the feed, not with the word **limestone** alone. Calcitic limestone is often brittle and relatively low-abrasive, but silica or chert inclusions increase abrasive wear, while moisture, clay and natural fines change feeding and screening behavior.



LIMESTONE

Carbonate rock

Main mineral: calcite

Wear boundary: silica/chert

ASSESS FEED CONDITION BEFORE ROUTE SELECTION

Feed parameter	What to check	Why it changes the circuit
Maximum lump size	Largest quarry/blasted lump; particle shape	Primary opening and first-stage reduction
Feed-size distribution	Coarse fraction, fines and near-size share	Crusher loading, screen duty and return load
Silica / chert	Silica/chert inclusions or siliceous bands	Wear exposure and crusher-route boundary
Clay / moisture	Sticky fines, surface moisture and coating	Feeding stability and screen blinding
Rock structure / brittleness	Compact, fractured, porous or friable feed	Breakage response and reduction ratio
Natural fines	Material already below primary-crushing duty	Pre-screening or bypass opportunity
Target products	Aggregate fractions, sand, cement or lime feed	Stages, shaping duty and screen cuts or rapid impact-part wear

LOWER-RISK DIRECTION FOR IMPACT / HAMMER

- **Brittle feed** with stable breakage response
- **Low to moderate abrasiveness** and limited silica/chert
- Controlled moisture, clay and natural fines
- Feed size compatible with the selected crusher family

CONDITIONS THAT REQUIRE STAGED EVALUATION

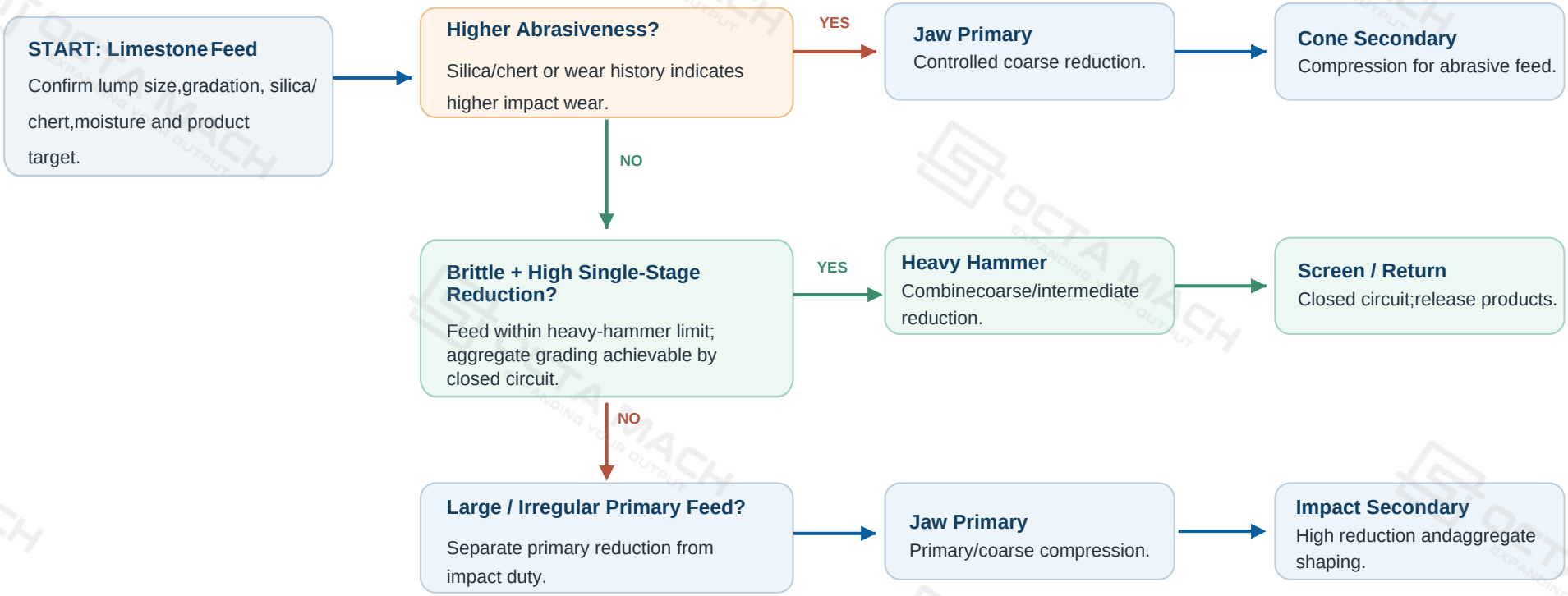
- **Higher silica/chert**
- Sticky clay, wet fines or unstable screen behavior
- Large irregular boulders or slab-shaped feed
- Variable quarry feed or tight multi-product grading

CORE RULE Hardness alone does not define the crushing route. Feed shape, abrasiveness, moisture/clay, required capacity and final product requirements must be evaluated together.

Technical basis: OctaMach equipment data; limestone mineralogy and mineral-processing screening references. Project feed testing remains the selection basis.

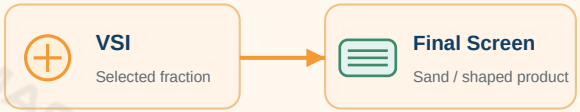
Limestone Crusher Route Decision Tree

Use the material condition to select the breakage mechanism first, then add only the crushing and shaping stages required by the final product.



FINAL PRODUCT CHECK

If the required output includes **manufactured sand or additional particle shaping**, route the selected pre-crushed fraction to VSI and final screening. Do not send the entire plant flow through VSI when qualified aggregate can leave earlier screens.



Route A: Jaw + Impact - large, low/medium-abrasive feed

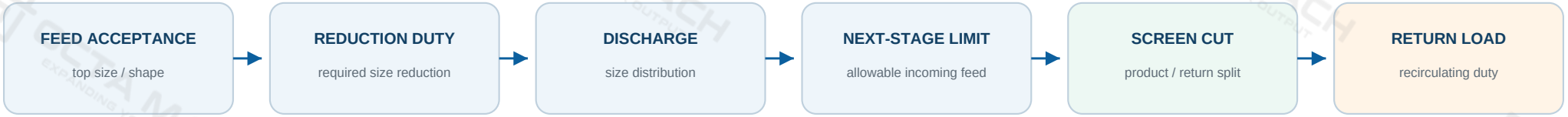
Route B: Heavy Hammer + Screen - brittle, high-reduction feed

Route C: Jaw + Cone - higher-abrasive feed

Technical basis: OctaMach crusher duty boundaries and published feed ranges. Final route depends on tested feed condition and required product grading.

Reduction Duty and Stage Matching

A crushing stage is correctly matched only when the incoming feed is acceptable to that machine and its discharge is compatible with the next crusher or screen. Feed opening, nominal capacity and final product size are separate checks.



Crusher family	Reference feed range / limit	Stage duty	Critical matching check
Jaw PE / PEX	Max feed about 120-1200 mm, model-specific	Primary / coarse	Check model max feed, not opening alone
PFW / PFV Impact	Max feed about 100-700 mm, series/model-specific	Primary / secondary impact	Confirm abrasiveness and stable feeding
PCZ Heavy Hammer	Supplied family max feed about 500-1200 mm	Single-stage / high reduction	Check brittleness, moisture and wear boundary
HP / CS / CH Cone	About 33-560 mm depending model and cavity	Secondary / tertiary	Match pre-crushed feed, cavity and outlet
5X / 6X VSI	Optimal feed: soft 35-60 mm; hard 30-50 mm	Fine crushing / shaping	Use pre-crushed feed; final size by screening

FEED OPENING IS NOT THE MAXIMUM LUMP TARGET

Representative jaw data show the margin clearly: **PE-600x900** has a 600 mm opening height with 500 mm max feed; **PE-900x1200** has a 900 mm opening height with 750 mm max feed. Flat or elongated pieces can bridge even when one nominal dimension appears to fit.

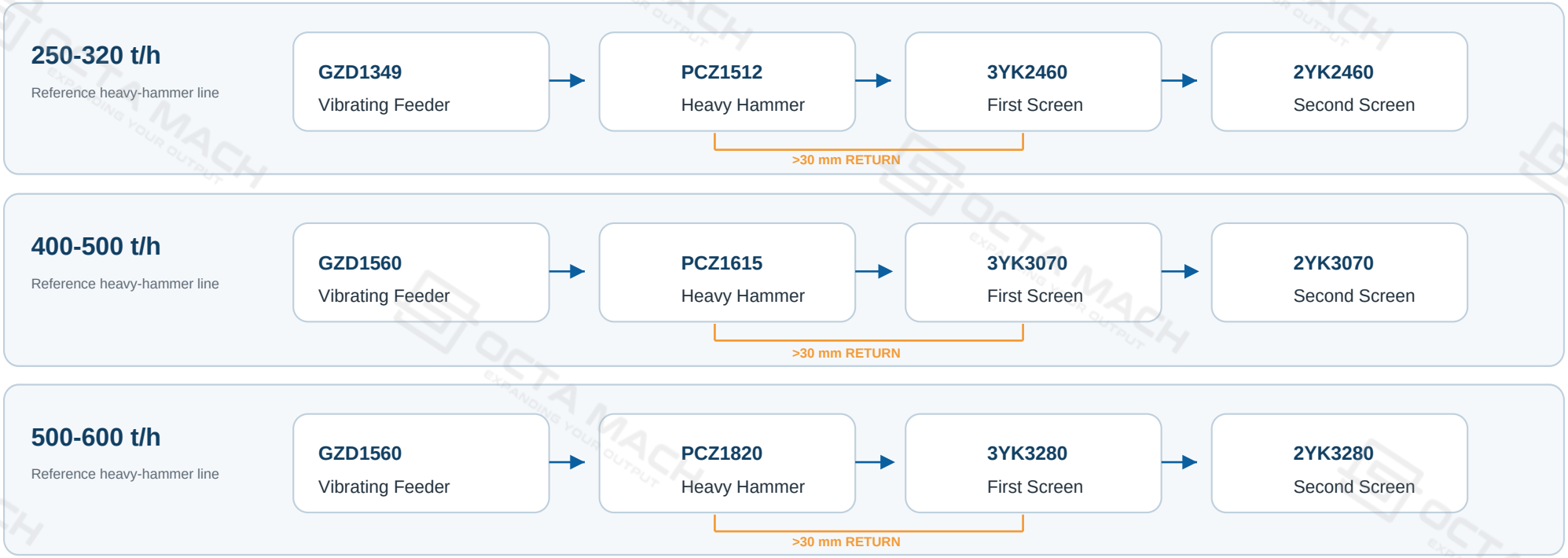
STAGE-MATCHING FAILURE SIGNALS

- **Oversize into downstream crusher:** bridging, shock loading or unstable chamber filling
- **Excess fines:** packing, lost effective crushing duty and heavier screen load
- **Coarse feed into VSI:** unstable rotor duty and accelerated wear
- **Undersized screen:** rising circulating load even when crusher capacity is available

Reference ranges: OctaMach published/supplied equipment data. Cone values are cavity-dependent; VSI values are optimal feed ranges, not primary-feed limits.

Capacity Configuration and Bottleneck Check

Plant throughput is a system result. The crusher, feeder, screens, conveyors and closed-circuit return must sustain the same operating duty under the actual feed condition.



CAPACITY INTERPRETATION

The capacity band is a **configuration reference**, not a guaranteed finished-product rate. Fresh feed and recirculating oversize both consume crusher and screen capacity.

Sustainable plant rate = system bottleneck

feeding | crushing | screening | return | conveying

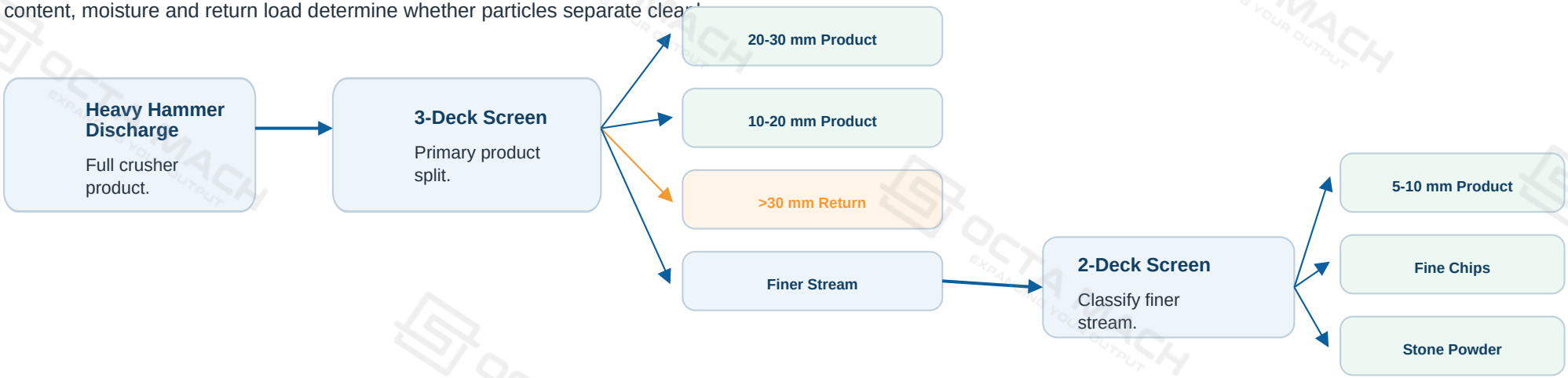
BOTTLENECK CHECK BEFORE ACCEPTING A T/H TARGET

- Fresh-feed gradation, largest lump and natural-fines fraction
- Moisture/clay, crusher setting and wear condition
- First-screen area and aperture under total feed + return load
- Second-screen duty, chutes, conveyors and stockpile routing

Configuration data: supplied heavy-hammer production-line plans. Product routing: 10-20 / 20-30 mm at the first screen; >30 mm return; finer stream to the second screen.

Product Grading and Screening Control

Finished limestone grading is established by the interaction of crusher discharge and screening performance. Aperture size alone is not enough: deck loading, near-size content, moisture and return load determine whether particles separate clean



Operating condition	Likely screening effect	Control direction
Excess moisture	Agglomeration and aperture blinding	Control sticky feed; use washing/wet screening if required
Clay / sticky fines	Blocked apertures; fines carried with oversize	Pre-screen, wash or use anti-blinding measures
High near-size content	Lower passage rate and separation efficiency	Provide adequate area; control bed depth
Overfeed / uneven distribution	Deep bed and undersize carryover	Stabilize feed and distribute across deck width
High circulating load	Return consumes crusher and screen capacity	Increase screening duty or improve upstream reduction
Worn / damaged media	Shifted cut size and product contamination	Inspect and replace damaged screen media

CONTROL POINT A coarse product is not automatically a crusher-setting problem. Check screen aperture, media condition, moisture, near-size loading and circulating load before tightening the crusher.

Technical basis: supplied closed-circuit limestone/stone line logic and mineral-processing screening behavior for moisture, near-size particles and screen loading.

Common Limestone Plant Selection Mistakes

Most selection errors occur at the interfaces between feed condition, crusher duty and screening - not from the absence of a larger crusher model. The table below links each common mistake to its operating consequence and the corrective direction.

Selection mistake	Engineering consequence	Better direction
Selecting by t/h alone	Feed size, reduction duty or screening does not match capacity	Confirm feed, products, return load and downstream capacity
Treating all limestone as low-abrasive	Silica/chert drives excessive impact or hammer wear	Check abrasiveness before impact/hammer vs compression
Using feed opening as the maximum feed target	Irregular lumps bridge or shock-load the crusher	Use model max feed with particle-shape margin
Forcing single-stage hammer crushing on unsuitable feed	Sticky/abrasive feed increases blockage and wear	Use feed preparation or staged crushing
Sending the entire plant flow through VSI	Unnecessary power, wear and VSI bottleneck	Send only the fraction needing sand/shaping to VSI
Oversizing crusher but undersizing screening	Return load rises and grading becomes unstable	Size screening/return for total circuit load
Ignoring moisture, clay and near-size particles	Screen blinding and unstable product fractions	Correct feed/screen conditions before crusher settings

RECOMMENDED SELECTION SEQUENCE

CIRCUIT FIRST, MODELS SECOND

Use project-specific feed testing and current model data for final release. Published catalogue capacity is a reference range, not a universal site-output guarantee.