**Equipment evolution: Crushing**

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**“The instruments nature provided for the purpose”**

- Hugh Johnson (1989)

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**Crushing**

- Produces more lees
- Can cause astringency if crushing is excessive (tannin increases proportionally more than colour)
- Prevents (possibly desirable) sensory characters from partial intracellular fermentation

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**Impressions of old centrifugal crusher performance* from the literature**

- High throughputs
- Effective crushing
- High juice yields
- High aeration
- Evaporative cooling of grapes
- Rough on skins
- High tannin and colour
- Large amounts of lees
- Not as suitable for table wines as roller crushers and not commonly used now

(*performance may be different at slower speeds)

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**Spring-loaded to avoid damage by stones, etc.**

One floating roller is supported by a spring-bar or coil springs. This allows the gap to open and any hard foreign objects to pass. The elasticity also gives a more uniform crushing. Late 1800s.

**Modern roller crusher**

Roller crushers are still the most common crusher style used. Typically they are lobed with elastomer outer and spring-loaded to avoid hard objects. They are also typically integrated underneath a destemmer.

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**Beater with fixed cage**

Rotary beaters both destem and crush in a single fixed cage. Mid to late 1900s.

**Beater with twin cages**

Twin-cages rotate. A beater rotates even faster (~500 rpm). The beater has elements within the inner cage to destem and between the cages to vigorously crush the destemmed grapes. Gambier c. 1860s.

**Simple**

Plain cylinders. Sometimes with nails to enhance feeding. Early 1800s.

**Centrifugal w/ destemming**

Modern spinning disc

Destemmed grapes or bunches fall into a single fast-moving disc and are projected into a wall to crush. Material is funneled to a second similar stage. Stems and seeds are not damaged. Paul c. 1906.

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**Crushing**

- Frees juice quickly
- Enhances extraction
- Facilitates alcoholic fermentation

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*Other sources include:* Bertucci (1949), Cazalla (1960), Fontaine (1905), Guyat (1864), Mauméne (1899), Ollari (1883), Otteil & Starchu (1920), Pacchetti (1915), Peymaud (1981), Rappine (2004), Redding (1960), Ross (1990), Thibault & Dupré (1972), Troost (1961) and many equipment suppliers.