JPI^{2024} body design outline

The JPI^{2024} design process first verifies and honors the tare (suspended + unsuspended) load distributions and spec. dimensions for any hauler size body configuration, *evaluated to date for 100 through 400 ton spec. bodies*; but considers the payload as a cone of material cut by the body walls and floor; this is taken to represent the base body capacity and payload (via broken material density) reference as a function of the material angle of repose. This indicates the load distribution variation versus the $^{1}/_{3}$:$^{2}/_{3}$ design target.

The body capacity is defined by the broken rock *(dynamic)* angle of repose, with the payload defined by the broken rock *(blasted)* density; where a specific site broken density, ρ_{broken} was defined through field observation and verified onboard payload reporting. JPI has developed a design solution for the max. capacity of a body, V as a function of the angle of repose, ϕ core to the JPI^{2024} body design, figure 1.

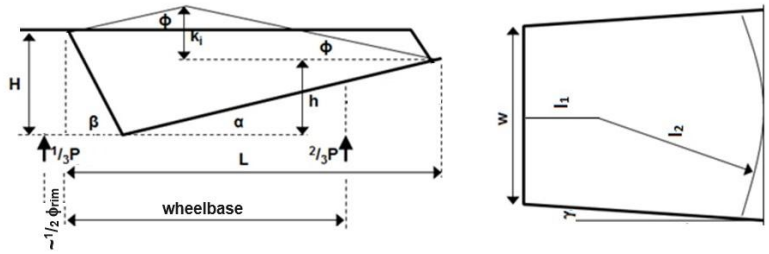

Figure 1: JPI^{2024} body analytical geometric design basis

Considering the GMW as proportional to the overall $^{1}/_{3}$:$^{2}/_{3}$ load distribution design target; comprising (*400 ton body example*) 48%:52% tare plus 23%:77% payload distributions, both the existing OEM body and the concept JPI^{2024} body models were verified using $^{1}/_{25}^{th}$ physical scale bench tests for broken materials of varying density and angle of repose, with 'cube root scaled' front:rear axle loads, where the bench scale bodies were constructed to enable direct axle load measurements, figure 2.

Figure 2: $^{1}/_{25}^{th}$ scale OEM body-capacity bench test

The JPI^{2024} body design process then targets to solely vary (a) the floor, (b) front (canopy) wall and (c) side walls' (lateral) angles (*and thus also the tail width*) to establish both (a) the widest range of broken rock and soil densities, and (b) the widest range of material angles of repose; permitting the front axle

load distribution to be achieved within a narrow range encompassing $^{1}/_{3}$ axle loading; while maintaining the original body model spec. (a) internal length (rear canopy to tail), (b) front wall internal width, (c) floor-front wall contact depth and (d) relative front and rear suspension positions.

Figure 3 below illustrates a bench scale design test that confirmed a balanced body with the JPI^{2024} body design, incorporating a fantail generated by adapted wall angles, a shallower floor & steeper front wall.

Figure 3: $^{1}/_{25}{}^{th}$ scale JPI^{2024} body bench test, including varying wall angles

Figure 4 below illustrates the crux of the body design benefit to the performance of a hauler, via an example outcome of the JPI^{2024} body design process, applied to a generic 400 ton body; while figure 5 illustrates an output analysis example improving the front axle load distribution using the JPI^{2024} body design process, defining a balanced body.

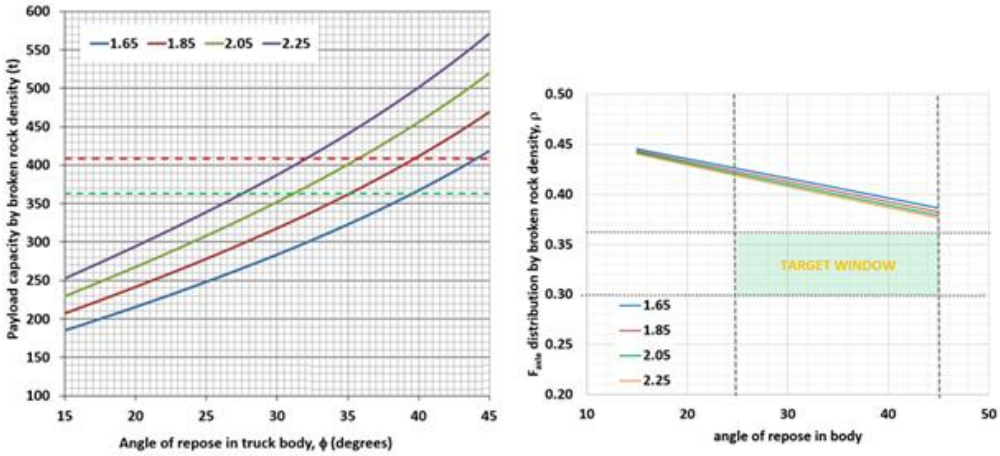

Figure 4: 400 ton existing OEM spec. body (a) payload capacity and (b) front axle load distribution

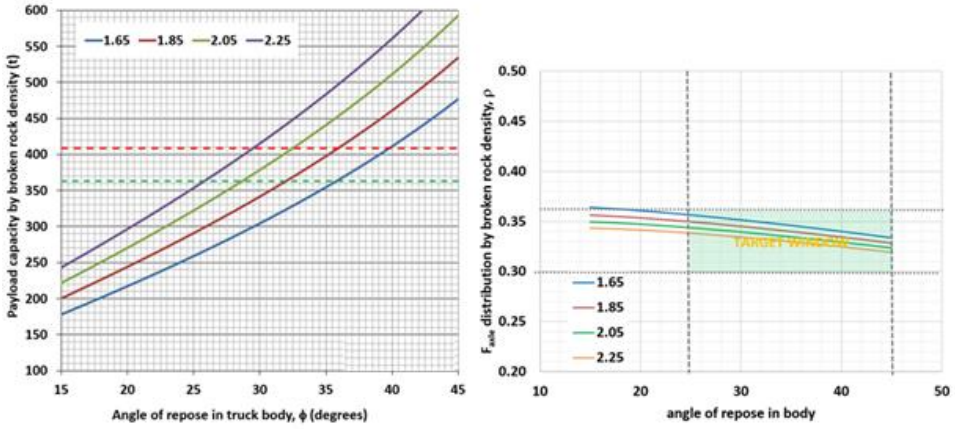

Figure 5: JPI[2024] body (a) payload capacity and (b) front axle load distribution

Invitation to consider

The design principles' IP and supporting bench testing performed to date are being offered to interested parties without restriction. JPI is interested in making such knowledge available to commercialize the JPI[2024] body design and associated process, with a hauler OEM or 3rd party hauler body manufacturer/fabricator, including the rights to all IP. As such, this design is open for discussion to move forward.

Design follow-up

JPI would welcome conversaton with interested OEM and fabrication parties. For all administrative, NDA and contractual agreements initially contact Laura Joseph, COO JPI at laurajoseph@jpicanada.com.