

60: Gekko™ in-line pressure jig – 1990s research in Australia



Figure 125. GEKKO™ IN-LINE PRESSURE JIG
 A skid-mounted IPJ at a placer gold mine in Australia. (photo: courtesy of Nigel Grigg of Gekko – www.gekkos.com)

The Gekko™ in-line pressure jig (IPJ) was invented by Alexander Gray of Victoria who was awarded patents in 1995 in Australia (AU #W095/26,232) and 2000 in the USA (US #6,079,567). The innovation was intended for recovery of low-grade high volume placer gold; later for hard rock grinding circuits [174-178].

A slurry pump drives the entire system. The negligible pressure drop ensures a 15-metre head to pump tailings up to a settling area, and allows jigs to be arranged in series if so desired. The IPJ has a moveable, rather than fixed, jig screen. The operator can dictate the height the jig bed rises and falls; and all particles are raised to the same height regardless of particle density. Jigging is a sawtooth pulse rather than simple pulse, and the operator can select the upstroke and downstroke speeds independently, as well as adjust the stroke duration via electronic control of the hydraulic drive.

The jig is very compact, treating up to five times more for same area of jig screen. The trommel or shaking screen can be low as the slurry is lifted to the jig by slurry pump. Water demand is lower than for most other jigs.

Operation

The maximum feed for a standard IPJ is 25mm – remarkably large. The slurry is pumped along a feed pipe into the top of the jig. Entering the distributor, the slurry is turned around upwards to spread out in the deceleration chamber. The jig is pressurised, sealed, and completely filled with water and slurry. The lack of a water surface is a deterrent to flour gold floating away.

The spreading motion, and unimpeded large circular area available for it, causes the slurry to slow to a velocity incapable of holding so much suspended solids. So the ‘heavies’ drop towards the jig bed and are trapped in the separation interface on the top of the jig bed. The jig bed is pulsed by a central drive shaft driven by the central drive ram at the unit’s base. The pulsing achieves episodic ‘quicksand’ (thixotropic) conditions.

During the dilation phase, gold separation occurs by density, plus segregation by differences in size and shape. In the suction phase, heavies are drawn through the ragging and screen to fall into the hutch – drawn off by a spigot as a continuous discharge. Nuggets stay on the jig screen awaiting batch discharge. The ragging is a 25mm thick carpet of lead shot covering the 2-3mm holes of the jig screen. The IPJ 1500 uses about 200 kilos of lead shot and Gekko has begun making ‘synthetic’ ragging.

Adoption by placer gold miners

Many IPJs are in hardrock gold mills. Placer applications include tin (New South Wales) and diamonds onshore and offshore in Namibia and South Africa. About 20 are installed at placer gold mines, in Australia, New Zealand, Papua New Guinea, North Korea, Guinea and Peru.

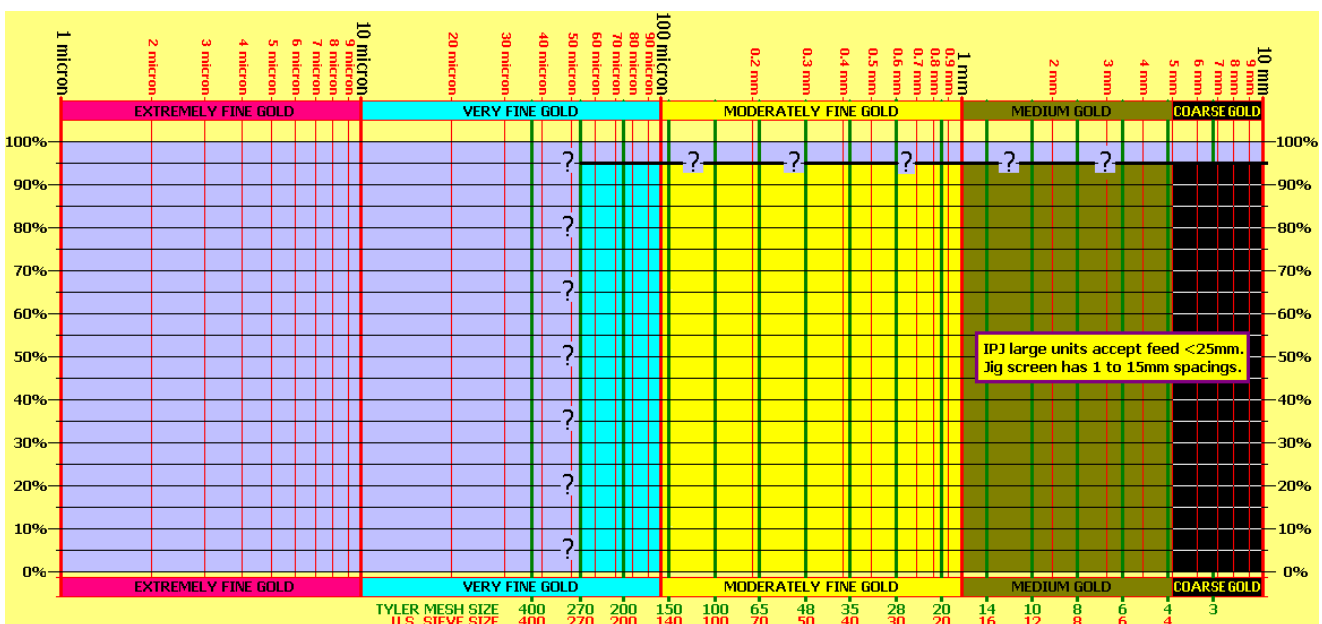


Figure 126. GOLD RECOVERY BY GEKKO™ IN-LINE PRESSURE JIG - generalised
 Recovery of placer gold by Gekko in-line pressure jig, based on information from the manufacturer. (compiler: Robin Grayson)