



# THE INVENTION THAT COULD REVOLUTIONIZE THE PIPELINE INDUSTRY

What do the ancient samurai warriors of Japan have in common with a London oil and gas tycoon? A flawless welding process.

BY ALEX WEBER

PAUL CHENG, A multi-national business consultant and London native, is on a mission to revolutionize the oil and gas industry with a patent-pending new pipeline-welding technology called FuseRing.

Most pipelines today are built using the standard welding method taught in high school shop class: two pieces of pipe are clamped and held still while either man or machine welds them together. The problem with this traditional style of welding is that a plane of weakness always exists.

“That’s why they always break,” says Cheng.

Cheng says there is a much better solution available: solid state fusion welding. It’s the most advanced and efficient form of welding in the world, but it has failed to gain commercial traction.

Inspired by the samurai swordsmiths of ancient Japan, who would break and rebuild a sword hundreds of times during its construction to dramatically strengthen the steel, solid state fusion welding has one of the two parts rotating, shearing the steel and causing the crystals to break and reform over and over again.

“You keep shearing it until it forms into the mother material’s crystalline structure,” says Cheng. “It’s brilliant.”

The result? A flawless weld with no weak spots.

But there is a reason solid state fusion welding has failed to take off commercially despite its proven strength and durability. Pipelines aren’t straight. And, you can’t

rotate a curved piece of pipe.

“We lay pipe end on end like a sausage factory, rotating and forging new joints of pipe until we come up against a bent segment,” he says. “It’s possible to compress the already-laid pipe slightly but impossible to torque several hundred metres of already laid pipe. And it’s impractical to rotate any bent pipe segment along its longitudinal axis.”

The solution? FuseRing.

FuseRing is a patented process, which uses a short segment of pipeline material designed to rotate and fuse when joining two pipeline pieces together, no matter what shape. The FuseRing acts as an intermediary between two non-rotatable segments and fuses them together using the solid state fusion welding method by rotating around them.

Cheng says the idea dawned on him “totally out of the blue.”

“Solid state fusion welding never gained popularity in big industries because you could never join the last joint,” he explains. “If you have to do the last joint manually, it negates the strength of the whole pipeline. And your insurance is always rated on the weakest spot.”

Cheng filed a formal patent application from London for the FuseRing concept in 2014 and it was cleared in December 2016. He also filed a second global patent in January 2017 outlining how FuseRing can be used in real-world pipeline construction.

Whereas traditional welding takes 30

minutes per joint, solid state fusion welding combined with FuseRing technology takes only one minute per joint. Cheng, who has overseen many global pipeline construction projects, also estimates that for a \$2-billion pipeline project, the FuseRing method would cut costs by 20 per cent.

It’s a technology that has global implications and is gaining attention around the world.

FuseRing technology is already being used on a deep-sea offshore oil rig in Brazil and in the construction of certain Mercedes-Benz vehicles.

Cheng’s game plan now is to sell FuseRing to oil and gas industry leaders and high precision manufacturers around the world. Recently, he was invited to showcase FuseRing at the American Petroleum Institute Conference in San Antonio in January, and at the Global Petroleum Show in Calgary, North America’s leading energy event, in June.

Cheng is hopeful that FuseRing will help to raise London’s manufacturing profile. Despite working all over the world, he’s called the city home since his family immigrated here from Hong Kong in the 1970s and giving back to the community that’s given him so much is very important to him. He’s even running for mayor in the 2018 municipal election.

“I’d love to see this turn into something big for London,” he says. “That would be the best case scenario.”

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