

Lead melting machine for caulking, 1901



Description

This is a black-and-white photograph of a group of five men gathered in and around the trench of part of the Coolgardie Water Supply pipeline. The men are posed around a joint between two lengths of pipe. On the pipe is a machine for melting the lead used for caulking (sealing) a joint. The men are formally dressed in hats, coats and even waistcoats, although conditions appear both hot and dirty. The photograph measures 21 cm x 16 cm.

Educational value

- The photograph shows men building the pipeline in the Coolgardie Water Supply Scheme, an engineering feat that attracted worldwide attention at the time and that has subsequently been declared an Australian national engineering landmark.
- The Scheme pipeline opened in 1903 and immediately solved water-shortage problems resulting from the gold rush that began in the 1890s when prospectors rushed to Western Australia's inhospitable eastern regions following amazingly rich discoveries at what became known as Coolgardie and Kalgoorlie. Men literally died of thirst in the arid country, while others died of diseases that spread due to a lack of sanitation and clean water. The gold-mining industry also needed water to develop, but attempts to obtain water from local underground sources and dams proved unsustainable and finally the pipeline from the coastal region was built at great expense.
- Caulking was a time-consuming process and a highly skilled construction stage at which individual pipe lengths were joined using a sealing process that ensured the pipeline did not leak. High quality caulking was essential to the success of the pipeline.
- There were about 60,000 joints in the 560-km pipeline, each of which had to be effective for the pipeline to be watertight, and caulking was usually carried out in



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sections of about 22.5 km. Some of the men included in the photograph were probably hand-caulkers.

- The particular stage of caulking that involved plugging the gap between the ring and pipes with lead was known as 'lead-running' and involved pouring molten lead into a funnel at the top of a collar around the joint, from which it would work its way down to the bottom, gradually filling the gap.
- Lead-running gave great trouble until the lead-smelting machine, shown in the photograph, sped up and simplified the process. Until the lead-smelter was devised, the lead tended to run out before cooling and solidifying tight. Use of the machine eliminated 'honeycombing' and other faults that had previously been experienced. The lead machine carried an acetylene gas generator, with the gas being burned in a small furnace beneath the pot holding the lead for melting.
- Lead-runners, some of whom are shown with the smelter, were specialist labourers who worked 40 or 50 joints ahead of the caulking machine to prevent delays and followed the ring setters who placed the rings.
- The sequence of the various operations in building the pipeline was carefully regulated, and the section of pipeline could not be buried until the joint inspector, possibly the man with the watch chain, had given approval. First, men repaired damaged pipe coating and chipped off coating at each end of the pipe to ensure good lead-running. Next came men who dug out circular areas in the trench corresponding to the joints. When the trench was ready, the pipe-layers lowered the pipe in. Then the ring-setters placed the rings, followed by lead-runners. After that came the caulking machine, and then the hand caulkers sealed the joint at the locking bars. The joint inspector's check was the final step.
- The photograph shows a caulking team and probably their inspector or supervisor. Teams competed to be fastest at caulking, but had to be careful not to make an ineffective joint because an inspector, reporting directly to head office and responsible for quality not cost, ensured the work was of a high standard. Inspectors also kept an eye on operations, and apparently there were many applicants for this job. The engineer in charge of construction wrote in 1900, 'We have a large number of applications from people who want positions as supervisors ... a man who cannot do anything else thinks he is eminently fitted to look at someone else doing something'.
- Uncomfortable conditions on the pipeline, such as those seen in the photograph, made it difficult for caulkers to produce uniformly good work and this led to the invention of the caulking machine. Caulkers had to spend long hours in cramped, exposed conditions in the pipe trench. Small circular areas were excavated at distances corresponding to the joints, but gave little room to manoeuvre. Packing lead by hand was particularly difficult on the underside of the pipe, since the men were virtually working upside down. The steel pipe became 'sprung' under even a light blow from a caulking hammer. Making a 100 per cent waterproof joint was almost impossible. In contrast, the machine applied equal pressure on both sides of the pipe and joint ring.

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Creator Edgar Evans, photographer, 1901

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