

AFD Ep 425 Links and Notes - Hard Hats [Bill/Rachel] (Recording May 8, 2022)

- Intro: This week, we're talking about the history of the humble "hard hat." As with many of our industrial history topics, defense contracts and other major government investments play a key role in the leap forward over rudimentary versions of the concept. Inspired by WWI helmets used to protect troops from shelling and other falling objects, shellacked canvas hard hats and metal or plastic hard hats were introduced to protect miners and dockworkers from falling debris and then rolled out more widely across other occupations. From that humble beginning, hard hat designs and materials improved to protect workers in a wide variety of environments and industries. Two ambitious projects - the Hoover Dam and the Golden Gate Bridge - brought worker safety to prominence, and created iconic images of the hard-hatted workers beginning in the 1930s. In the following decades, hard hats improved even further, and innovations are still coming down the pike in the present day.
- Pre-helmets: Docks & Mines
 - Dockworker sun-cured pitch-covered hats
 - Miners were always in the market for head protection and lighting but until the early 20th century they were generally still just making do with leather caps or whatever and hoping for the best. Two of the most important companies in the field of hardhat development were originally mine equipment supply companies: From the west coast E.D. Bullard Company established in 1898, and from the east coast Mine Safety Appliances (now MSA Safety Incorporated) established in 1914 and partly focused on safe head-lamps.
- Influence of World War I
 - Helmet design from the war + "suspension" system (1919)
 - When World War I began in 1914, unlike in medieval and early-modern warfare, none of the armies were issuing helmets to their troops, but head-based casualties rapidly emerged as a massive problem on all sides and the war became visually associated with the various national helmet designs that started rolling out.
 - Bullard's son returned from the war in Europe when it ended in 1918 and brought with him the iconic steel M1917 Brodie Helmet of the British and American forces, which was designed to reduce injury or fatality from falling shrapnel from air-burst shells or environmental objects thrown into the air by explosions. (It was not really meant to protect against direct hits or bullets.) https://en.wikipedia.org/wiki/Brodie_helmet The "soup bowl" style Brodie design had been advantageous to British and US war manufacturers because it was a very simple design and pressed from a single sheet of steel, rather than being joined together from multiple pieces. Bullard Company decided to adapt the design shape for civilian use in the mines, creating a steamed-canvas and glue version. Bullard also added an internal "suspension" system, which absorbs the impact shock even more and further reduces forces acting on the head and spine.
 - Bullard's US Navy contract after the war (1919) – The US Navy quickly awarded a contract to Bullard for non-mine use of the new design: their shipyard workers.
- Thermoplastic (Bakelite - possible future episode?) helmet - 1930: Mine Safety Appliances in 1930 pioneered a thermoplastic design called "Skullguard" made from Bakelite resin, and reinforced with wire screen and linen, all of which had a major advantage over earlier designs... they could be used in electrical work without

conducting electricity and they could be used in high-heat metalworking environments without melting or falling apart.

- Hoover Dam mandate: Initially, when the project began work in 1931, head protection was not provided, and so workers at risk of falling debris or objects (tools dropped by fellow workers were a common source of injury, more so than falling rock!) turned to the traditional dockworker remedy of sun-cured tar-covered cloth caps, which proved surprisingly effective at mitigating dangerous and lethal head injuries on the job site – so much so that the corporate consortium building the project decided to order thousands of proper hard hats, I think of the Bullard canvas design based on the use of the term “hard-boiled hat” which wouldn’t have really applied to the Bakelite design from MSA. By purchasing these hard hats and mandating their use on the work site, the companies not only avoided lost work time from accidents and negative attention for the death toll, but they also helped manage the public perception of the highly-photographed and media-covered project. Basically the workers looked even cooler doing their death-defying stunts in the canyon to build the dam.
https://en.wikipedia.org/wiki/Hoover_Dam#Groundworks,_rock_clearance_and_grout_curtain
- Golden Gate Bridge mandate (variants including steel or face protectors): A couple years after the Hoover Dam project began, the Golden Gate Bridge project got under way, and workers were mandated to use a variety of specific head protections. From the Wiki on “hard hat”: *Construction workers were required to wear hard hats, by order of Joseph Strauss, project chief engineer. Strauss strove to create a safe workplace; hence, he installed safety nets and required hard hats to be worn while on the job site. Strauss also asked Bullard to create a hard hat to protect workers who performed sandblasting. Bullard produced a design that covered the worker's face, provided a window for vision and a supply of fresh air via a hose connected to an air compressor. The MSA Skullgard was the best, but quite expensive. Many hard hats were made of cheaper steel.*
- [After these 2 pre-New Deal projects helped with hard hat adoption, I assume New Deal projects probably made the hard hat widely visible & recognizable, especially because they were so extensively photographed by the government] (Not mentioned in any source I found, but stands to reason.)
https://www.researchgate.net/publication/269084546_Hoover_Dam_Construction_Milestones_in_Concrete_Delivery_and_Placement_Steel_Fabrication_and_Job_Site_Safety#pf22 (Hoover Dam 75th Anniversary History Symposium 2010)
- Aluminum helmets - Bullard, 1938 They were lighter and more affordable than previous models, but obviously couldn’t work for electrical work applications. Was a favorite of forest-firefighters.
- Fiberglass - Bullard 1940s Heat-resistant; used in various defense plants across the US
- Injection molded thermoplastics - MSA, 1950s into 1960s: this is basically the modern era of hard hats, but they’re continuing to iterate and tweak the designs even to the present, especially for specific use cases where something particular is needed. MSA is still a big name in hard hats at this time. In 1952, they released the Shockgard helmet for linemen; it’s able to protect the wearer from electrical shock of up to 10,000 volts. In 1961, they released the Topgard Helmet, the first polycarbonate hard hat. Today, most hard hats are made from High-Density Polyethylene (HDPE) or Polyetherimide (PEI). In 1997, the American National Standards Institute (ANSI) allowed the development and use of ventilated hard hats to keep wearers cooler. Permitted accessories include sun visors, face shields, earmuffs and perspiration-absorbing cloths; attachments include walkie-talkies, radios, pagers and cameras.

- Bullard is still a family-owned business, currently being run by Wells Bullard, Edward W. Bullard's great-granddaughter and Edward D. Bullard's great great-granddaughter.
<https://www.smithsonianmag.com/innovation/history-hard-hat-180974238/>

(We used this for much of today's outline https://en.wikipedia.org/wiki/Hard_hat)

Hard hats have their origins among dockworkers, and next time we'll be talking about the decline and fall of traditional ports and dock work.