HeritageBC

Industrial Heritage Cultural Map
Historical Context

Clockwise from top left: Abernethy & Lougheed Logging train, 1920s. (Maple Ridge Museum & Community Archives, P00703) ; Miners in Red Mountain mines, (Rossland Museum & Discovery Centre 2309.0043); McDonald Jam Factory, Nelson, 1980. (by Al Petersen); Hirasawa Family Farm, 1938 (by Goro Hirasawa)

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Industrial Heritage Cultural Map

Setting the Scene

TABLE OF CONTENTS

INTRODUCTION

To comprehensively communicate the breadth and depth of industry in the land known today as British Columbia is an enormous task. The tangible and intangible heritage and cultural landscapes tied to a myriad of still-existing or long-gone industries, sites, communities, technologies, successes and failures, and positive and negative impacts for a region as large as BC is vast.

This document does not strive to cover it all. In fact, it merely scratches the surface. However, it does attempt to set the scene for the development of industry in BC and to encourage the reader to consider both the positive and negative ways in which industry has played a role in shaping this province.

WHAT IS INDUSTRIAL HERITAGE?

The *International Committee for the Conservation of the Industrial Heritage* (TICCIH) defines industrial heritage as "*the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to industry such as housing, religious worship or education*."

This descriptive definition can be complemented by a more evocative statement made in a research piece advocating for more industrial sites within the UNESCO World Heritage Site framework:[1]

> *"Guardians of the past, industrial sites testify to the ordeals and exploits of those who worked in them. Industrial sites are important milestones in the history of humanity, marking humanity's dual power of destruction and creation that engenders both nuisances and progress. They embody the hope of a better life, and the ever-greater power over matter."*

In an extension of the phrase "ever-greater power over matter," we should look to this as also encompassing power over people and nature. Though the sites themselves are symbolic of advancements in technology and the globalization of the world, the bigger picture of the impact on surrounding lands, Indigenous Peoples and communities must also be woven into the narrative shared about the impact of industry. In short, as the TICCIH describe it, industrialization is the most significant engine of change in human history.[2]

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[1] Michael Falser, "Global Strategy Studies Industrial Heritage Analysis, World Heritage List and Tentative List," (2001), https://whc.unesco.org/archive/ind-study01.pdf

[2] "Industrial Heritage Retooled." https://ticcih.org/industrial-heritage-retooled-available/

ARRIVAL OF INDUSTRIALIZATION TO CIVILIZATION

The Industrial Revolution began in Britain in the 18th century and spread around the world in subsequent decades. It marked the shift from an agrarian and handicraft economy to one dominated by industry and machine manufacturing.[3] However, this was not the beginning of the human quest to extract, process, refine, store or transport natural resources. Such activities provided people with goods, tools or supplies that enhanced naturally found materials either in volume or specification and turned them into items not naturally found in nature. Utilizing natural resources in this way has gone hand in hand with our ability to adapt and grow as individual civilizations, particularly in prehistory and ancient history.

There are many examples of the processing of natural materials from the centuries and millennia before the Industrial Revolution. The oldest recorded mining activity was at least 42,000 years BP (before present) at the Ngwenya Mine in Eswatini.[4] In BC, there is the Arrowstone Hills toolstone quarry in BC's South Central region, on the unceded territories of the Secwépemc and Nlaka'pamux Nations. Here, research suggests the site was used for over 11,000 years to gather and process lithic materials[5] and was close to several other toolstone sites, just in this region alone. Such Neolithic toolstone sites and workings are of course found around the world.

Moving forward through time, the discovery of the smelting process gave humans the ability to produce metals from their ores.[6] The later discovery of producing alloys by mixing metals gave new metals with different properties. Other examples from ancient history include canals, aqueducts and waterwheels, as well as mills, including early stone sawmills from over 3,000 years BP.[7]

Moving through the Medieval period in Western Europe, innovations in agriculture and milling and a growth in population and cities[8] can be classed as industry. As the march from the 16th to 19th centuries progressed, the scale and intensity of industry increased with inventions such as the printing press, along with the growth of the global population and the increase in commodity prices and travel and trade between countries and across oceans to other

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[3] "Industrial Revolution." Encyclopedia Britannica, https://www.britannica.com/event/Industrial-Revolution

[4] "Ngwenya Mines." UNESCO, https://whc.unesco.org/en/tentativelists/5421/#:~:text=Ngwenya%20Mine%20is%20situated%20on,the%20world's%20earliest%20mining%20activity

[5] Mike K. Rousseau, Mike K. "Toolstone Geography of the Pacific Northwest," Edited by Terry L. Ozbun and Ron L. Adams. Archaeology Press, Simon Fraser University, (2015): pp. 29-48, https://archpress.lib.sfu.ca/index.php/archpress/catalog/download/20/6/119-1?inline=1?inline=1

[6] Smelting. Encyclopedia Britannica, https://www.britannica.com/technology/smelting

[7] Paul Kessener, "Stone Sawing Machines of Roman and Early Byzantine Times in the Anatolian Mediterranean," (2010), https://www.academia.edu/7326869/Stone_Sawing_Machines_of_Roman_and_Early_Byzantine_Times_in_the_Anatolian_Mediterranean

[8] Christopher Brooks, "Western Civilization: A Concise History," Open Educational Resource," (2020), https://pressbooks.nscc.ca/worldhistory/

continents. Cities, societies and private organizations became more complex, widespread and, relative to preceding centuries, much more efficient.[9]

The stage of development from the 16th century to the beginning of the Industrial Revolution in Europe is referred to by some as proto-industrialization.[10] Though not a consistently agreed upon series of events and factors by historians, we can at least appreciate that the time before and during the colonization of Indigenous lands in Canada and the birth of settler communities and economies was greatly influenced by the ever-growing impact of industry, both here and in the colonizers' original countries, most notably Europe.

INDUSTRY AS A COLONIZING FORCE

By the time of Canadian confederation in 1867, the Industrial Revolution in Britain and northeastern United States was well underway. However, even before this, as non-Indigenous people spread across the land, industry followed. Confederation only increased the pace of industry as an open colonial marketplace flourished without tariffs, and trade switched to a focus of east-west instead of north-south. The transport of goods intensified even more with the completion of the railway network including the Canadian Pacific Railway.[11]

Pre-emption of land was a way (legal by provincial law but discriminatory and to the extreme detriment of Indigenous Peoples) for settlers to "claim" land deemed to be vacant, unclaimed and unsurveyed for the purpose of "improving" it through agriculture.[12] Western views on what was unclaimed, vacant or in need of improvement were in direct contradiction with the resource harvesting, cultivation and management of lands on the territories of the Indigenous Peoples on which these uninvited guests settled.

These early homesteaders collectively "claimed" large parcels of land across BC. They cleared forests, built dikes along riverbanks, drained wetlands and built farms where once there had been natural ecosystems that had supported hundreds of thousands of people for generations. Lulu Island at the mouth of the Fraser River, for example, and today known as Richmond, had once been prairie grass, marshland and sloughs providing rich harvesting grounds of berries, crabapple and salmon to Coast Salish Peoples. Pre-emption turned the island into farmland for settlers, with sloughs infilled and dikes built to prevent flooding.[13]

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[9] Richards, "*The Unending Frontier*"

[10] Jacques Barzun and Judith Eleanor Herrin, "Proto-industrialization," Encyclopedia Britannica, https://www.britannica.com/topic/history-of-Europe/Protoindustrialization

[11] John Douglas Belshaw, "Canadian History: Post-Confederation," BC Campus (2016), https://opentextbc.ca/postconfederation/

[12] "Quick Guide to Pre-emption and Homestead Records." Royal BC Museum, https://royalbcmuseum.bc.ca/assets/Pre-emptions_homesteads_quick_guide.pdf

[13] Mary Keen, "Time and Tide: The Settlement of Lulu Island's South Arm Shore," Richmond Neighbourhood Series, https://www.richmond.ca/__shared/assets/timeandtide35862.pdf

Extension mine employees and mules, circa 1909. Boys as young as 12 years worked in the mines. Photo credit: Nanaimo Museum

Settler governments, investors, and workers were striving for a modern, industrious nation, or what they perceived to be as the way forward to a new economic order. Wage-earning workers were more important to this vision than farm settlers.[14]

The general narrative of the development of resource extraction on this land was fur trading by the Hudson's Bay Company (HBC) followed by the gold rush followed by the explosion of industry. Though the HBC was indeed focused on the fur trade, they did establish Fort Rupert on Vancouver Island in the late 1830s at Beaver Harbour, a Kwagu'ł (Kwakiutl) village site called t̓saxis, in order to extract coal. For around a decade, Kwagu'ł People dug out coal and traded it with the HBC. However, beginning in 1848, coal miners from Scotland and England were brought in. The ensuing events, in what can be described as an experiment to establish an industry, were a disaster, resulting in a workers' strike, murder, the shelling of the Nahwitti village, damaged relations between the Kwagu'ł People and the HBC and the delay of coal mining as one of BC's earliest industries.[15]

Miners from Morden Colliery in front of the colliery's tipple, 1915. Photo Credit: Friends of Morden Mine Society fonds, Nanaimo Archives

However, the flame of the desire to mine coal was not extinguished. Coal mining as an industry was eventually established by settlers farther south on Vancouver Island, such as the Canadian Collieries at Cumberland (from 1888) and Extension Mines near Nanaimo (from 1897). These sites were joined by other early industrial sites such as sawmills, including the Chemainus Sawmill, built in 1862 and the Fraser Mills site from 1889. By the late 1800s, canneries including the Britannia Cannery in Richmond and the Defiance Cannery in West Vancouver were also operating. These are just a fraction of the early industrial sites that sprang up around BC as investors, entrepreneurs, timber speculators, prospectors, politicians and businessmen saw economic benefits in the harvesting or extraction of BC's natural resource riches.

AN EMPTY LAND TO HARVEST—OR SO THE SETTLERS THOUGHT

Indigenous Peoples have lived throughout this land since the end of the last glacial period, which had ended by around ten thousand years ago. The lands and waters sustained them, and they learned to manage the resources in a way that provided for their needs while stewarding, through cultivation and management, the resources for future generations.

Pre-contact population estimates for BC vary widely, with some estimates ranging from a conservative 200,000 to more than a million.[16] However, the

[14] Belshaw, "Canadian History: Post-Confederation."

[15] John Douglas Belshaw, "The Island Colony," BC Campus (2015), https://opentextbc.ca/preconfederation2e/chapter/13-8-the-island-colony/

[16] "The Impact of Smallpox on First Nations on the West Coast," Indigenous Corporate Training, https://www.ictinc.ca/blog/the-impact-of-smallpox-on-first-nations-on-the-west-coast

arrival of European diseases, in particular smallpox, decimated these populations as they had no immunity.

By the time of European colonization in the latter half of the 19th century, those arriving here mistakenly viewed the land to be largely empty. Without the knowledge of seasonal rounds to harvest resources over large territories, or an understanding of just how many people had died from smallpox, many settlers viewed the land as being there for the taking.

One example of this was the infilling of tidal flats in the Eastern Core area of Vancouver, east of False Creek and once known to settlers as False Creek Flats. This was once an area of rich natural resources that supported the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Peoples. The tidal flats and surrounding area were ideal fishing and hunting grounds. However, the deep waters of False Creek and easy access to open waters were attractive to early industrialists. CPR president Sir William Van Horne declared it useless and suggested it be filled. This ultimately happened, leading to the area becoming a railway and industrial hub in Vancouver,[17] home to sites such as the Restmore Manufacturing Factory and the western terminus of the Canadian Pacific Railway.

Crew of Lynn Valley Lumber Co. mill on skid road in 1906, in front of a logged old growth tree. Photo credit: NVMA, 104

Another more widespread example was the birth of the logging industry. Logging had begun for shipbuilding, but increased as the gold rush, followed by the mining boom in the Interior, greatly increased the demand for timber. The wide swathes of large trees in the forests of the Coast Mountains were highly sought after among timber speculators.[18] Without an understanding of the essential nature of forest ecosystems, the trees were felled in vast numbers, including trees hundreds of years old. Sawmills sprang up around the province to process millions of board feet annually. The opening of the Canadian Pacific Railway in 1886 only accelerated the demand for West Coast timber from markets in the Prairies and beyond.[19] With the demand for timber high and the forest covering around 60 million hectares, it is perhaps easy to appreciate why the logging industry developed as it did.

TRADITIONAL INDIGENOUS KNOWLEDGE AND INDUSTRY IMPACTS

Indigenous Peoples across Canada have been guardians of lands and waters since time immemorial. Their understanding of natural environments allowed them to survive and thrive in the millennia before European contact. This included the cultivation of species such as in the Salish Sea clam gardens, or

[17] Donald Luxton, "Eastern Core Statement of Significance," Donald Luxton & Associates Inc. (2013), https://vancouver.ca/files/cov/statement-of-significance-false-creek-flats-2013-april.pdf

[18] "British Columbia In A Global Context," British Columbia Geography Open Textbook Collective (2014), https://opentextbc.ca/geography/chapter/7-3-history-of-commercial-logging/

[19] "British Columbia In A Global Context," British Columbia Geography Open Textbook Collective.

the harvesting and processing of other species such as the capturing of eulachon in nets to extract a rich grease through a complex process.[20] As guardians of the land who also lived off the gifts from the land, they took no more than they needed and only when their assessment showed that the ecosystem could cope with the harvesting of the resource.

In comparison, as early immigrant industrialists settled in BC and began establishing logging and canning operations (for example), they began the exploitation of resources and lands for economic gain, which had sustained Indigenous Peoples by providing food, medicines, transportation, supplies and cultural sites for generations.

However, the relationship between Indigenous Peoples and early resource harvesting was complex, as parallel to the stripping of the resources they relied upon was a necessity to adapt to a new wage-based and capitalist economy.

Following depopulation from illnesses such as smallpox, loss of rights and title through colonization, settlement by immigrants and the appearance of the new wage-based economy, many Indigenous Peoples became increasingly dependent on the growing capitalist situation.[21] In doing so, many sought to adapt to the new reality they found themselves in and take advantage of opportunities through wage labour and commodity production.[22] As a result, many local Indigenous People were often hired as labourers on farms, in canneries, sawmills, ports and other sites. Indigenous workers were paid less than white workers, despite many having skills that aided the industrialists.

Stó:lō People worked on hop farms to earn seasonal income between the summer and fall salmon runs.[23] Guides and packers from Nations along the route of the Cariboo Wagon Road were critical in the transport of supplies during its construction owing to their strength and nimble-footedness,[24] especially on narrow trails along the Fraser Canyon.

Indigenous skill in harvesting fish was also instrumental in the early salmon fisheries on rivers across BC including the Fraser, Nass and Skeena. Indigenous fishers saw an opportunity to sell catches to canneries. However, as time passed, their fishing rights were throttled to benefit the white fishermen. They were also only paid as labourers instead of being able to sell their catch. Inside

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[20] Chief Adam Dick (Kwaxsistalla Wathl'thla), Daisy Sewid-Smith (Mayanilth), Kim Recalma-Clutesi (Oqwilowgwa), Douglas Deur (Moxmowisa), and N.J. Turner (Galitsimǧa), "From the beginning of time: The colonial reconfiguration of native habitats and Indigenous resource practices on the British Columbia Coast," FACETS. 7 (2022): 543-570. https://doi.org/10.1139/facets-2021-0092

[21] Squamish Nation, *tiná7 cht ti temíxw (We Come From This Land)* (Friesens, 2024).

[22] Charles R. Menzies and Caroline F. Butler, "The Indigenous Foundation of the Resource Economy of BC's North Coast," Labour/Le Travailleur, 61 (2008): 131–149. https://www.erudit.org/en/journals/llt/2008-v61-llt61/llt61rn01.pdf

[23] Andrew Seal and Taranjit Singh, "Craft-beer hop farm in Stó:lō territory slated to be one of Canada's largest," CBC, https://www.cbc.ca/news/indigenous/craft-beer-hop-farm-in-sto-lo-territory-to-be-one-of-canada-s-largest-1.4086378

[24] Mica Jorgenson, "Into That Country to Work: Aboriginal Economic Activities during Barkerville's Gold Rush," BC Studies, no. 85, Spring 15 (2015): pp109-136. https://ojs.library.ubc.ca/index.php/bcstudies/article/download/185910/185454/197155

the canneries, it was often Indigenous women who deftly worked gutting, filleting and canning the fish.[25]

Traditional skills working with wood also led many Indigenous People to work in the logging industry. Sḵwx̱wú7mesh People worked as longshoremen in Burrard Inlet owing to their skill in moving large logs.[26] In the north, Ts'msyen People traded pickets and cedar bark to the Hudson's Bay Company's Fort Simpson, built on Ts'msyen territory. Soon after, the men were hired to log and process wood as they performed the task much better than the fort's men.[27]

Today, Indigenous Nations excel in industrial endeavours, such as the Squamish Nation's Nch'kaẏ̓ Development Corporation, which operates forestry operations that lead in sustainable resource management, or Nk'Mip Cellars, the Ossoyos Indian Band's winery. In such endeavours, they infuse their traditional culture and traditional wisdom and combat colonialism to re-establish their rights and title among other authorities, with the goal of securing economic development in the process.

The strength of such Nations in an industrial landscape today was, of course, not always this way. In addition to the discrimination outlined in the examples above including loss of territorial lands and waters, Indigenous Peoples also suffered from the 1876 *Indian Act*, residential schools, the Sixties Scoop and racism among the general settler population. The strengthening of these Nations in contemporary society must also continue, as outlined in the United Nations Rights of Indigenous Peoples (UNDRIP) and the BC Declaration on the Rights of Indigenous Peoples Act (DRIPA). With regard to developing sustainable industries, their traditional knowledge was, and remains, indispensable.

AN INFLUX OF KNOWLEDGE FROM AFAR

The majority of immigrants to early colonial Canada were unskilled workers who filled, and endured, difficult physical roles building railways, roads and river dikes, as examples. However, skilled workers also brought knowledge from their homelands, which contributed to the growth of industry.

Chinese shipbuilders were the first group of foreigners known to have been brought here for industrial skills. In 1788, fur trader John Meares brought twenty-nine Chinese workers, including carpenters, blacksmiths and masons,

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[25] "Aboriginal Fisheries in British Columbia," Indigenous Foundations, https://indigenousfoundations.arts.ubc.ca/aboriginal_fisheries_in_british_columbia/

[26] Squamish Nation, *tiná7 cht ti temíxw (We Come From This Land)*.

[27] Charles R. Menzies and Caroline F. Butler, "The Indigenous Foundation of the Resource Economy of BC's North Coast," Labour/Le Travailleur, 61 (2008): 131–149. https://www.erudit.org/en/journals/llt/2008-v61-llt61/llt61rn01.pdf

with him on a voyage to BC. These workers built the first ship in BC, the *North West America.*[28]

Later, it was the men from Britain who arrived at Port Rupert in the late 1830s to try to establish the Hudson's Bay Company's coal mine. The men were brought for their coal mining experience. Both Scotland and England had long-established coal mining industries by this time and as the decades unfolded, many Brits arrived with the experience needed to develop the industry here. This included Robert Dunsmuir, a man from a coal mining family who went on to establish several economically successful but notoriously unsafe coal mines on Vancouver Island.[29]

Much later than the early shipbuilders, other Chinese workers who immigrated to BC in the late 19th and early 20th centuries found themselves using agricultural skills from home. Though not running large-scale agricultural operations, they did have a collective large-scale contribution to make. In 1921, 90% of BC's vegetables were produced and distributed by Chinese immigrants running market gardens. These farmers succeeded by using their experience in growing food while adapting to a new social, political and economic environment.[30]

Japanese Canadian fisher is on his boat with a gillnet on the Fraser River, circa 1930s. Photo credit: Delta Museum and Archives.

Japanese Canadians were also significant contributors to the development of industry. Though not subjected to the discriminatory Head Tax imposed by the Canadian government on Chinese immigrants, Japanese immigrants were, however, barred from working in professional roles. Many worked instead in the emerging logging and mining industries. Those with experience in farming and fishing turned to those industries instead. Steveston and the lower Fraser River were central to the Japanese Canadian fishermen. Some established villages on nearby islands, such as Oikawa Island (now known as Don Island) and Sato Island (now known as Lion Island). Japanese Canadian fishermen were also skilled boatbuilders and built boats during the off-season. They built high-quality and sought-after boats with tools not used by other nationalities. The Matsumoto Shipyard on Burrard Inlet, which ran in the latter half of the 20th century, took orders from as far away as East Africa owing to the quality of the boats they built.

Miso shipment at Tashme shoyu and miso factory at the Tashme Internment Camp, Fall 1943. Photo credit: UBC.RBSC.JCPC.29

However, the contribution of Japanese Canadians to industry and community in BC was not enough to spare them from racism and discrimination. Following the attack on Pearl Harbour in December 1941, Japanese-Canadian fishing boats were impounded. Soon after, over twenty thousand Japanese Canadians were forcibly uprooted and confined during their internment in World War II, with their homes and businesses sold by the government. The trauma of internment

[28] Margaret Horsefield and Ian Kennedy, "Chapter 3. King George's Men," (2015), https://www.knowbc.com/limited/Books/Tofino-and-Clayoquot-Sound-A-History/Chapter-3-The-King-George-Men

[29] John Douglas Belshaw, "The Island Colony".

[30] Natalie Ruth Gibb, "Parallel Alternatives: Chinese-Canadian Farmers and the Metro Vancouver Local Food Movement," (2006), https://summit.sfu.ca/_flysystem/fedora/sfu_migrate/11725/etd6663_NGibb.pdf

cannot be underestimated, but it is also notable that some industry sprang up in the camps, including the Lillooet Tomato Cannery and the Tashme Shoyu Factory near Hope. Here, internees used skill, experience and determination to establish viable operations, selling their goods far and wide.[31] [32]

These are just a few examples of the ways in which industrial skills and experience were imported into the province over the decades of industrial growth.

DIVERSITY OF INDUSTRY

The early industries were focused on the extraction and harvesting of natural resources such as logging or fishing. But in time, new industries emerged to take advantage of new technologies, new demand for goods, growth in the labour market, increased immigration and globalization and increased funding from wealthy investors here and abroad.

In categorizing different types of industry, a useful reference is the Historic American Engineering Record (HAER) categories of industrial structures (see Appendix A). Ten main categories, 69 subcategories and around 250 individual industrial-type structures are identified. Though not an exhaustive list of industry types, using the subcategories as a basis, BC has >80% of this list. It is therefore safe to say that BC is highly varied in the industries that have been established here since that first attempt at a coal mine on Vancouver Island in the mid 19th century.

BIRTH OF SETTLER COMMUNITIES AND TRAVEL CORRIDORS

Before European contact, Indigenous Peoples of this land lived more nomadic lives, travelling seasonally to hunt, harvest or gather supplies. Seasonal camps allowed families and communities to be where they needed to be on their territories to take advantage of the gifts from the land at the right time of year. Permanent villages sheltered communities through harsh winter weather[33] or were located at important resource or transport sites.[34]

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[31] Laura Saimoto, "Lillooet Tomato Cannery & Industry," (2023), https://heritagebc.ca/wp-content/uploads/2024/08/Lillooet-Tomato-Cannery-Industry-Submission-f.pdf

[32] Tak Negoro, "The Last Japanese Family to leave Tashme," Tashme Historical Project, https://tashme.ca/stories/tashme-stories-tak-negoro/

[33] Marianne B. Ignace, Nancy J. Turner and Sandra L. Peacock, "Secwepemc People and Plants: Research Papers in Shuswap Ethnobotany," Contributions in Ethnobiology (2016), https://ethnobiology.org/sites/default/files/publications/contributions/Secwepemc-web-07-2017.pdf

[34] Squamish Nation, *tináʔ cht ti temíxw (We Come From This Land)*.

This pattern follows what is seen across the world, where people establish permanent or temporary communities close to a much-needed natural resource. Examples include fertile floodplains, natural harbours, fish spawning areas, mineral deposits, timber supplies, rivers for transport and even just flat land among the mountains.

The camps, towns and villages that sprang up in the province during early colonial times were similar in that there was a mix of temporary and permanent settlements, located close to natural resources. However, the settlers were not travelling seasonally. Logging and mining camps were dotted throughout, and there were many of them. Over 2000 past-producing mineral properties alone are recorded.[35] Many of these were small mining camps operating in the earlier boom and bust years. On remote mountain slopes or in valleys, men set up camp and worked until the resource was mined out before they moved on. Logging camps were also numerous and short-lived.

Where the natural resource was larger, or if the town was fortunate enough to be on what transpired to be a main travel route, more permanent settlements were established as company towns or planned new towns. In company towns, all workers and buildings were under the control of the company undertaking the industry.[36] As many of these towns were in remote locations, companies built amenities such as movie theatres and swimming pools along with schools and hospitals in a bid to attract and retain quality workers, including families.[37] It was not uncommon for these towns to become cemented in the hearts of the people who lived there during their time with the company. Being isolated, the towns often developed into tight-knit communities where people looked out for each other and lifelong friendships were made.

Labourers at work on surfacing the deck of the Lions Gate Bridge,1938. Photo credit: NVMA, 5294

Other towns evolved on the back of a variety of industries. Nelson, for example, evolved based on transportation patterns, regional mining, waterways to feed hydroelectric power, flat lands for a railway hub, and a climate/land suitable for agriculture.[38] In Vancouver, there were varied reasons it became the city it did, but these included being the western terminus of the Canadian Pacific Railway, a port to other markets in North America, Asia and beyond, and within easy access and shipping of the giant trees sought after by timber speculators.

These early colonial settlements, whether today's ghost towns, towns that continue with industrial activities, or towns that adapted to other economic drivers such as tourism, are central to BC's early industrial development and are part of the fabric of BC itself. It is also perhaps no surprise to see them along the main travel corridors that exist today. Old routes such as the Dewdney Trail

[35] "MINFILE", Ministry of Energy, Mines and Petroleum Resources, https://minfile.gov.bc.ca/searchbasic.aspx

[36] Allen Seager, "Company Towns," The Canadian Encyclopedia, (2006), https://www.thecanadianencyclopedia.ca/en/article/company-towns

[37] Lucie K. Morisset, "Identity on the Land, Company Towns in Canada," (2019), https://www.academia.edu/43181812/Identity_on_the_Land_Company_Towns_in_Canada

[38] Denise Cook Design, Birmingham & Wood Architects and Planners Stephanie Fischer, "City of Nelson Community Heritage Register Update, June 2011," (2011), https://www.nelson.ca/DocumentCenter/View/689/Heritage-Register-Update-Report---2011.PDF

or Cariboo Wagon Road (parts of which followed older Indigenous trade and travel routes) connected these early settlements and resource areas and in turn, evolved into the routes we know today. Other early towns were established along the coast, often in sheltered inlets where they could be accessed by boat.

A GROWING ECONOMY

The early growth of BC's economy differed from the rest of Canada. While other parts of Canada took advantage of agriculture, BC generally had only the fur trade and gold rush to establish an economy. That was until the completion of the Canadian Pacific Railway (CPR) in the 1880s. The CPR along with the later Grand Trunk Pacific Railway (GTPR) and Canadian Northern Railway opened up trade and the ability to transport goods much more easily. This led to increased development, urbanization and growth of industry.[39]

In addition, trade with Pacific nations opened up with the ships setting sail from Vancouver and Prince Rupert as they became the terminuses for the CPR and the GTPR respectively. Timber, metals, manufactured goods, and food/beverage products among others were exported out of the province, bringing dollars in as a result.

Upper Bonnington dam and powerhouse with Kootenay Canal in background. Photo credit: Nelson Museum, Archives and Gallery

One advantage BC had (and still does) over other parts of the land is mountains to produce hydroelectricity, giving cheap, renewable energy.[40] Though fluctuating with the seasons (and also resulting in impacts to local ecosystems through changing natural waterways), industrial sites or small towns were able to generate their own electricity giving them an economic advantage over those that relied on coal or diesel plants.

Assisting in economic development were of course the workers and the rise in population. BC's population expanded roughly tenfold between 1851 and 1921 from 55,000 to 524,582.[41] Without these workers essentially building the province, there would have been no economic growth. From the early years, working conditions were often harsh as these lower-class settlers fought for safer conditions and better pay against many senior management and elites who ran the companies where profit was the goal.[42]

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[39] Ian M. Drummond and Gord McIntosh, "
Economic History of Western Canada," The Canadian Encyclopedia (2018),
https://www.thecanadianencyclopedia.ca/en/article/economic-history-of-western-canada

[40] Hugh James Johnston and Robert A.J. McDonald, "Agriculture, forestry, and fishing: British Columbia, Economy, " Britannica (2024),
https://www.britannica.com/place/British-Columbia/Agriculture-forestry-and-fishing

[41] "Archived - Historical statistics, population and population density per square mile, " Statistics Canada,
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710006701&pickMembers%5B0%5D=2.1&cubeTimeFrame.startYear=1851&cubeTimeFrame.endYear=1921&referencePeriods=18510101%2C19210101

[42] Rod Mickleburgh, "On the Line: A History of the British Columbia Labour Movement (Harbour Publishing, 2018).

Coal baron Robert Dunsmuir is perhaps synonymous with the divide between elites and workers. Making his fortune in coal on Vancouver Island, he was also a railway developer and politician and therefore had a large influence on the growth of the region and its economy. Yet his disregard for safety and working conditions and his suppression of unions made him deeply unpopular with the working class.[43]

This reliance on a workforce to harvest, extract or process natural resources under industrial conditions for shipment to other parts of Canada or the world has continued through to today, albeit with advancements in working conditions, safety, unionization, environmental regulations, technologies and Indigenous relations among others.

ENVIRONMENTAL COST OF INDUSTRY

25 ton cast-iron pot dumping molten slag. Slag is the waste product of the copper smelting process. Photo: Greenwood Museum P366

John F. Richards, in his book *The Unending Frontier* examining the environmental history of the early modern world, writes that, "The long-term effects of human action are best seen in detail at the local level, but best understood in a holistic global perspective."[44] This statement succinctly reflects the impacts of industrialization on BC communities and environments and the contribution each industry collectively made to the wider impacts of climate change and biodiversity loss.

Four global patterns emerged in the ways that humans impacted the environment during the 16th to 19th centuries. These were intensified human land use along settlement boundaries adjacent to natural environments; the spreading of invasive species moving with people and goods as they travelled further and faster; intensified commercial hunting; and energy and resource scarcity in core areas, most importantly food scarcity at a time when harvest failures could lead to social disorder and fuel demands put increasing pressure on local forests and other fuel supplies.[45]

Colonial settlers in BC arrived to a land that they incorrectly perceived to be mostly empty and unclaimed (see An Empty Land to Harvest—Or So The Settlers Thought) and with a seemingly endless supply of natural resources. The common belief was that these resources were there for the taking and were a means to support the often remote nature of being a colonizer where self-sufficiency was often key. This perception was not limited to BC as it was happening in other parts of the world where European settlers were colonizing land, and it had been happening for several centuries.[46]

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[43] "Robert Dunsmuir, Biography," Craigdarroch Castle, https://collection.thecastle.ca/Detail/entities/1835

[44] Richards, "The Unending Fronier"

[45] Richards, "The Unending Fronier"

[46] Richards, "The Unending Fronier"

Harvesting and extracting resources had, until around the 1960s, largely progressed without pushback from society at large. Industry had provided a strong economy and jobs and too little was understood by settlers about the harm caused to local environments from industrial activities, whether that was clearcutting forests, waste outflow from factories, mines or mills, or the damming of waterways for power generation as examples.

However, the environmental movement began to gain ground slowly but with increasing speed through the 20th century. The first provincial park, Strathcona, was created on Vancouver Island in 1911. By the 1930s, new parks were established in the BC Interior in a bid to protect wilderness areas from logging companies who were increasingly encroaching on the region.[47]

By the early 1970s, settlers were beginning to wake up to the damage caused by unsustainably conducted industries. Acid mine drainage, a byproduct of certain mining practices, found its way into waterways, such as at Britannia Beach[48], causing dead zones and deformities in species including salmon. Mining also results in the need to deal with large amounts of waste rock, including tailings ponds, which can lead to devastating consequences on the local ecosystem if not effectively managed. Such management of outflows and waste is required even after the mines are closed and, in many cases of older mines, abandoned.

Logging operators were clearcutting vast swathes of forest and harvesting old growth trees upwards of 500 and 1000 years old. This logging reduces critical habitat for species and destabilizes slopes that otherwise limit erosion, among other environmental benefits. Both the cultural and ecological damage from logging pitted the government and industry against a growing call for action by First Nations, conservationists and activists. This included the 1993 Nuu-chah-nulth-led blockade in Clayoquot Sound, which became known as the War in the Woods. This standoff ultimately led to stricter logging regulations and eventually, more Indigenous-led control over traditional territories.[49]

Britannia Cannery warehouse, with 1,500,000 cans, 1895. Photo credit: City of Richmond Archives 1991 2 25

Commercial fishing was another industry with notable impacts. In BC, the early industry from around 1870 onwards largely focused on salmon migrations, with fishermen and canneries catching and processing as much as they could during fishing season. For around a century after, commercial fishing went through boom and bust cycles, with other fish harvested as well as bigger boats and new technologies ensuring larger catches. Such development was encouraged at governmental level. Though attempts at managing stocks went back as far as the Halibut Treaty of 1923, the push for development led to the depletion of fish stocks, an issue that remains today.[50]

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[47] "History of Conservation in BC." https://www.spacesfornature.org/greatspaces/bchistory.html

[48] W.G. (Bill) Smitheringale, "Great Mining Camps of Canada 5. Britannia Mines, British Columbia," https://journals.lib.unb.ca/index.php/gc/article/view/18783/20600

[49] "War in the Woods," Knowledge Network, https://bcanuntoldhistory.knowledge.ca/1990/war-in-the-woods

[50] "Joseph Gough, "History of Commercial Fisheries," Canadian Encyclopedia, https://www.thecanadianencyclopedia.ca/en/article/history-of-commercial-fisheries

Though forestry, mining and fisheries have been touched on here, many of the industries in BC had environmental impacts. From dams and water controls limiting salmon migrations to wetlands or estuaries being infilled for railway yards or industrial facilities, to pesticides and fertilizers polluting waterways and killing pollinators, there are many ways that early industrial practices caused untold damage to the local environment (and in many cases, still do today when left unchecked).

Some of these impacts are irreversible, but others can be remediated. There is hope if action is taken. Remediation of industrial sites has shown that even some of the worst polluted sites can be brought back from the brink. Howe Sound in southwest BC is one such place. By the mid to late 20th century, the marine environment was significantly impacted by pollution, most notably from former industrial sites including the Britannia Mine, Nexen chlor-alkali plant and Woodfibre Pulp and Paper Mill. However, advocacy, new regulations and restoration have led to a significant recovery of the marine environment. In 2021, UNESCO announced the prestigious designation of the watershed as Canada's 19th Biosphere Region. Part of the designation decision stemmed from the transformation of the region into a model for environmental recovery.[51]

INDUSTRY IN BC TODAY

Today, industry in BC remains essential to the province's economy, jobs and communities. Some industries, such as commercial whaling operations have (thankfully) ceased, though whaling in BC remained until 1967.[52] Others remain but are vastly diminished in numbers and run very differently, for example, the Nuu-chah-nulth-owned fish cannery on Vancouver Island, one of the last remaining canneries in Canada and respected for its sustainable fishing practices (unlike its many predecessors).[53] Some industries are new, including the aerospace, clean tech or Rec-Tech (recreation-technologies) industries, taking advantage of strong demand and investment along with a skilled workforce choosing to live in regions such as Metro Vancouver.

Other industries continue the long tradition of resource harvesting, albeit with greatly different regulations, knowledge and societal expectations. Of the strong industries in BC today, mining, forestry and agriculture remain sizeable and influential.[54] Their roots are in the early years of European colonization, but recent decades have seen a turnaround in their practices. Hand tools and oxen or horses were replaced by mechanization, railways and trucks. These

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[51] 'Where is Átl'ka7tsem / Howe Sound." Howe Sound Biosphere Region Initiative Society, https://www.howesoundbri.org/atlka7tsem-howe-sound

[52] "Commercial Whaling Ends," Knowledge Network, https://bcanuntoldhistory.knowledge.ca/1960/commercial-whaling-ends

[53] St Jeans, https://stjeans.com/about-us/our-history/

[54] "Farming, natural resources and industry," Government of BC, https://www2.gov.bc.ca/gov/content/industry

industries continue to run on the latest, innovative technologies, though today these technologies include AI, autonomous equipment and virtual reality as examples. These industries also respond to ongoing academic advancement of science and policy development with some university departments dedicated to advancing more sustainable practices, such as Natural Resource Sciences at Thompson Rivers University or the Mineral Deposit Research Unit at the University of British Columbia. In addition, old practices such as "mine and move" have been replaced by regulatory expectations of environmental remediation, where mitigating the impacts of resource development must be considered during early planning and accounted for long after the mine has closed.[55]

Oil and gas is also a significant BC industry today, with early wells being drilled as far back as 1906, though as a fully-fledged industry, it did not ignite until the 1950s.[56] Like mining, forestry and other industries, the petroleum sector is heavily regulated today and some companies also participate in research for carbon capture and storage development.[57]

BC, along with Canada, is also on its path to net-zero emissions. The CleanBC Roadmap declares that "The scale of the climate emergency we are living through demands that we act with even greater urgency."[58] Many industries in BC today are striving to cut greenhouse gas emissions and advance sustainability goals, such as those set out in the United Nations' Sustainable Development Goals, an overarching set of seventeen goals to benefit people, prosperity and planet.[59]

Though significant work remains to be done to progress reconciliation and healing the trauma caused by settler colonization, requirements are now written into law regarding consultation on industrial development. For example, the right to free, prior and informed consent is required by the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).[60] This is a complex, contentious and inadequately understood process that is yet to be properly realized. However, in comparison to the earlier years of industry in BC, there has been change, and in many cases, momentum is picking up steam. For example, some companies sign memorandums of understanding or benefits

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[55] "Mineral Exploration & Mining," Government of BC, https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining

[56] "A Brief History of Oil and Gas Exploration in British Columbia," Government of British Columbia, https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-gas-oil/petroleum-geoscience/brief_history_of_oil_and_gas_exploration_in_bc.pdf

[57] "Collaboration Enables Geoscience BC's Next-Stage Carbon Storage Assessment for Northeast BC," Geoscience BC, https://www.geosciencebc.com/collaboration-enables-geoscience-bcs-next-stage-carbon-storage-assessment-for-northeast-bc/

[58] "CleanBC, Roadmap to 2030." Government of British Columbia, https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf

[59] "The 17 Goals," United Nations, https://sdgs.un.org/goals

[60] "Honouring our Ancestors, Free Prior And Informed Consent In Business," British Columbia Assembly of First Nations," https://www.bcafn.ca/sites/default/files/docs/reports-presentations/FNA_Doc_V2_lt11_pages.pdf

agreements with local First Nations, such as the Port of Prince Rupert reaching an agreement with the Coast Tsimshian First Nation in 2011 in advance of an expansion of port capacity.[61]

In short, industry today in BC has changed immensely from the early years. We continue to learn lessons from the past and evolve our expectations and understanding of cultural and natural aspects of the world around us. In the past, we shaped industry just as much as it shaped us. What the future holds for industry, BC, its environments, communities, First Nations and economy is up to us.

Note: all photos used in this document can be found in the galleries of the sites on the Industrial Heritage Cultural map.

[61] "Prince Rupert port reaches key deal with First Nations," Prince George Citizen, https://www.princegeorgecitizen.com/local-news/prince-rupert-port-reaches-key-deal-with-first-nations-3710976

APPENDIX A

As outlined in Falser (2001), the Historic American Engineering Record (HAER), a sub-division of the United States National Park Service, identified ten categories of industrial structures with many subcategories. These are given below for reference.

CATEGORIES

0. Extractive Industries (e.g. Ore- or Gold-mining)

1. Bulk Products Industries (e.g. Primary Metal Industries)

2. Manufacturing Industries (e.g. Machine Manufacture)

3. Utilities (e.g. Water Supply, Electricity)

4. Power Sources and Prime Movers (e.g. Water wheels, Steam turbines)

5. Transportation (e.g. Railroads, Cannels, Harbour)

6. Communication (e.g. Radio, Telephone)

7. Bridges, Trestles, Aqueducts

8. Building Technology (Roof systems, Fenestration)

9. Specialized Structures / Objects (e.g. Dams, Tunnels, Hydraulic works)

0. EXTRACTIVE INDUSTRIES (EXTRAC)

01. Iron Mining (IRON)
02. Anthracite & Bituminous Mining (COAL)
03. Crude Petroleum & Natural Gas (OIL)
04. Non-Metallic Minerals (UNEL)
- 0 Dimension stone
- 1 Crushed and broken stone
- 3 Sand & Gravel
- 4 Chemical and fertilizer minerals
- 5 Gemstones
- 6 Salt
- 9 Other

05. Non-Ferrous Ores (NON-FER)
- 0 Copper
- 1 Lead and Zinc
- 2 Gold and Silver
- 3 Bauxite and Aluminum
- 4-8 (BLANK)
- 9 Other

06.0 Surface
07.0 Subsurface
08.0 (BLANK)
09.0 Other

1. BULK PRODUCTS INDUSTRIES (BULK)

10. Agriculture and Rural Industries (AGRI)
- 0 Agriculture engineering
- 1 Farm buildings and machinery
- 2-3 (BLANK)
- 4 Ginning
- 5 Tobacco products
- 6-9 (BLANK)

11. Thermally produced products (THERM)
- 0 Brick & structural clay works
- 1 Pottery
- 2 Glass works
- 3 Cement plants
- 4 Charcoal Kilns
- 5 Lime Kilns
- 6 Coke ovens
- 9 Other

12. Chemical Industry (CHEM)
- 0 Industrial organic and inorganic chemicals
- 1 Plastics & synthetics
- 2 Pharmaceuticals
- 3 Soaps, detergents, and animal products
- 5 Paints and varnishes
- 7 Agricultural chemicals

8 Petroleum products
9 Other

13. Food Processing (FOOD)
0 Meat, fish, and poultry products
1 Dairy and bakery products
2 Grains and cereals
3 Sugar (beet and cane)
4 Beverages (breweries, distilleries, and bottling plants)..
5 Food preservation (refrigeration and canning).
6-8 (BLANK)
9 Other

14. Primary Metal Industries (METAL)
0 Stone-based iron furnaces
1 All other iron furnaces
2 Steel works and rolling mills
3 Iron and steel foundries (cast ferrous products)
4 Iron and steel forges
5 Non-ferrous metal smelters & refineries
6 Rolling, drawing, and extruding works (non-ferrous metals)
7 Non-ferrous foundries
8 Non-ferrous forges
9 Other

15. Textiles (TEXT)
0 Cotton spinning and/or weaving
1 Wool spinning and/or weaving
3. Silk spinning and/or weaving; man-made fibers
4 Knitting
4-5 (BLANK)
6 Handloom weaving
7 Textile finishing (printing, dyeing, etc.)
8 Twine, cordage, netting, and bagging
9 Other

16. Lumber, Timber, and Paper Industries (WOOD)
0 Logging
1 Millwork, veneer, plywood and other wood products
2-3 (BLANK)
4 Paper making
5 (BLANK)
6 Sawmills and/or planing mills
7-8 (BLANK)
9 Other

17. (BLANK)
18. (BLANK)
19. (BLANK)
20. (BLANK)

2. MANUFACTURING -INDUSTRIES (MFG)

21. Machine Manufacture (MACH)
0 Engines, turbines, pumps, and compressor manufacturers
1 (BLANK)
2 Agricultural implements and machinery manufacturers
3 Construction, mining, and materials handling equipment manufacturers
4 Metal and woodworking machinery manufacturers
5 Paper making machinery, manufacturers
6 Textile machinery manufacturers
7 Printing trades machinery manufacturers
8 Electrical generating manufacturers
9 Other machinery manufacturers

22. Fabricated Metal Products Manufacturers (FABR)
0 Cutlery and handtools
1 (BLANK)
2 Metal containers
3 Plumbing fiytures and equipment
4 Fabricated structural metal products
5 Metal Stampings
6 Wire and screw machine products
7-8 (BLANK)
9 Other

23. Transportation Equipment Manufacturers (TEQUIP)
0 Automobiles and trucks
1 Air and space equipment
2 Ships and boats (including repairs)
3 Railroad locomotives and rolling stock
4 Motorcycles and bicycles
5 Carriages, wagons, and accessories
6 Fire engines and equipment
7 Auxiliary and control equipment
8 (BLANK)
9 Other

24. Professional,-Scientific, and Precision Instrument Manufacturers (INST)
0 All

25. General Manufacturing (GENHFG)
0 (BLANK)
1 Publishing and allied industries
2 Rubber products manufacturers
3 Leather and other animal skin products manufacturers
4 Cooking and heating equipment manufacturers
5 Toys, games, and novelties
6 Paper and plastic consumer products manufacturers
7 Craft industries
8 (BLANK)

9 Other

26.0 Ordnance, Munitions, and Explosives (ORDAN)

27.0 Finished Wooden Product Manufacturers (furniture, spools, barrels, baskets, etc.) (FNWOD)

28. (BLANK)

29. (BLANK)

30. (BLANK)

3. UTILITIES (UTIL)

31. Municipal Water Supply (WATER)

0 Collection storage
1 Treatment
2 Distribution and transportation
3 Pumping
4-8 (BLANK)
9 Other

32. Sanitation (SANI)

0 Sewage collection
1 Sewage treatment
2 Sewage disposal
3 Storm drainage systems
4 Pumping
5-8 (BLANK)
9 Other

33. Gas (GAS)

0 Manufacture
1 Storage
2 Distribution
3-8 (BLANK)
9 Other

34. Electricity (ELEC)

0 Generation
1 Municipal distribution
2 (BLANK)
3 High-voltage transmission
4-8 (BLANK)
9 Other

35. (BLANK)

4. POWER SOURCES AND PRIME MOVERS (PS&PM)

36. Human and Animal Power (MUSL)

0 All. types

37. Water Wheels (WW)

0 Horizontal (tub flutter)
1 (BLANK)
2. Undershot-
3 Overshot
4 Breast
5 Pitchback
6-8 (BLANK)
9 Other

38. Water Turbines (WTURB) 0 All types

39. Wind (WIND)

0 (BLANK)
1 Smock
2-8 (BLANK)
9 All other

40. Steam Reciprocating (STEAM RECIP)

0-5 (BLANK)
6 Industrial/mill
7 Agricultural/portable
8 Marine/pumping
9 Other

41. Steam Turbine (STEAM TURB)

0-2 (BLANK)
3 All types - vertical
4 All types - horizontal
5-8 (BLANK)
9 Other

42. Internal Combustion (INT COMB)

0 All types

43. (BLANK)

44. Electric Motors. (ELEC)

0 All types

45. (BLANK)

46. (BLANK)

5. TRANSPORTATION (TRANS)

47. Railroads (RR)

0 Construction & engineering: non-sheltering such as cuts, fills, revetments, bridges, and tunnels
1 Structures: sheltering (for maintenance of route & rolling stock)
2 Passenger stations & sheds
3 Freight facilities
4 Objects (such as locomotives, rolling stock, and other mechanical artifacts)
5 Street railways, subways, and elevateds
6 Incline- planes
7-8 (BLANK)
9 Other

48. Roads (ROADS)

0 Systems
1 Construction
2 Structures
3 Objects: milestones, signposts, etc.
4-8 (BLANK)
9 Other

49. Canals and Inland Navigation (CANAL)

0 Systems
1 Construction
2 Structures
3 Objects: canal and river boats
4 Navigational aids
5-8 (BLANK)
9 Other

50. Marine and Harbor Works (MARINE)
0 Docking facilities and structures
1 Navigational aids
2 Coast protection works
3 Objects: ships and other marine related artifacts
4-8 (BLANK)
9 Other

51. Air (AIR)
0 Airport facilities & structures
1 Aircraft
2-8 (BLANK)
9 Other

52. Pipelines (PIPE)
0 All

53. (BLANK)

54. (BLANK)

6. COMMUNICATIONS (COMM)

55. Telephone and Telegraph (T&T)
0 All types

56. Radio and Television (R&TV)
0 All types

57. (BLANK)

7. BRIDGES, TRESTLES, AND AQUEDUCRS (BT&A)

58. Beam or Girder (BEAM)
0 Wood
1 Stone
2 Cast iron
3 Wrought iron
4. Steel
5 Mass and reinforced concrete
6 Cast & wrought iron
7-8 (BLANK)
9 Other

59. Arched (ARCH)
0 Wood
1 Cast iron
2 Wrought iron
3 Stone
4 (BLANK)
5 Mass and reinforced concrete
6 Steel
7 Brick
8 (BLANK)
9 Other

60. Trussed (TRUSS)
0 Wood
1 Cast iron
2 Wrought iron
3 Steel
4 Covered
5 Cast & wrought iron
6-8 (BLANK)
9 Other

61.
0 Suspension

62.
0 Aqueducts

63. Viaducts and Trestles (VIAD or TRES)
0 All types

64. Cantilever (CANT)
0 All types

65. Movable Bridges (MOVE)
0 Bascule
1 (BLANK)
2 Swing
3 Vertical lift
4-8 (BLANK)
9 Other

66. (BLANK)

67. (BLANK)

68. Miscellaneous (MSC)
0 Pontoon

8. BUILDING TECHNOLOGY (BLD TECH)

69. Foundations (FOUND)
0 All

70. Framed Superstructures (FRAME)
0 Wood
1 Cast iron
2 Wrought iron and steel
3 Stone and brick
4 Mass and reinforced concrete
5 Ferro-vitreous

71. Floor Systems (FLOOR)
0 All

72. Roof Systems (ROOF)
0 All

73. Fenestration (FENES)
0 Cast-iron facades

74. Mechanical and Electrical Systems (IECH)
0 All

75. Ancillary Components (ANCIL)
0 All

76. (BLANK)

77. (BLANK)

78. (BLANK)

9. SPECIALIZED STRUCTURES AND OBJECTS (SPEC STRUC)

79. Dams (DAM)
0 Masonry
1 Earthfill
2 Rockfill
3 Arch
4 Flat slab or Anberson
5 Multiple-arch

6 Tainter (movable)
7 Rolling (movable)
8 Gravity
9 Other

80. Tunnels (TUNLS)
0 Cut & cover
1 Rock-cut
2 Earth-cut
3 Subaqueous
4-9 (BLANK)

81. Hydraulic Works (HYDRA) See also 31: Water Supply, and 49: Canals
0 Flood-control works
1 Drainage works
2 Power canals
3 Irrigation works
4-8 (BLANK)
9 Other

82. Specialized Construction (CONST)
0 Underground structures
1 Rocket launch facilities
2 Facilities for reactors and particle accelerators
3 Fortifications
4 Towers
5 Observatories

83. Thermal Structures (HEAT)
0 Chimneys and smokestacks
1 Ovens
2 Kilns
3 Furnaces (see also 14.0)
4 Glass cones
5 Refrigeration plants
6-8 (BLANK)
9 Other

84. Materials Handling and Equipment (MMH)
0 Excavating and dredging machinery
1 Lifting and hoisting
2 (BLANK)
3 Conveyor systems
4 Combined systems
5 Processing, screening, and separating equipment
6 Aerial tramways
7-8 (BLANK)
9 Other

85. Materials Storage (MATS)
0 Elevators & Silos
1 Tanks & towers
2 Gas holders
3 Warehouses
4 Reservoirs
5-8 (BLANK)
9 Other

86. Power and Energy Transmission (P&ET)
0 Mechanical
1 Electrical
2 Hydraulic
3 Pneumatic
4 Steam

87. Workers Housing, Communities, and Other Related Artifacts (HOUS)

88. Adaptively Used Industrial and Engineering Works (ADAPT)

89. Museums of Technology (MUSEUM)

90. Land Surveying Landmarks (LAND)

91. Amusements

92. (BLANK)

93. (BLANK)