THOMPSON
METAL FAB

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April 14, 2022

Steven Fischer
Bridge Administrator
U.S. Coast Guard
Thirteenth District

RE: U.S. Coast Guard Public Notice D13-PN-02-22 - Proposed replacement of the I-5 Twin Bridges between Portland OR and Vancouver WA.

Mr. Fischer,

Please accept this submittal in response to your request for comments related to navigation on the Columbia River requiring vertical clearance of the Interstate Bridge between Portland, OR and Vancouver, WA and per your U.S. Coast Guard Public Notice D13-PN-02-22.

Thompson Metal Fab, Inc (TMF) is one of the largest specialty plate fabricators on the west coast, focusing on infrastructure related to marine, highway, hydro, and energy (both clean and oil and gas) markets. Our facility has over 275,000 sf of indoor crane serviced manufacturing space located upstream of the Interstate Bridge in Vancouver, WA. In addition to the manufacturing facility, we also have 15-20 acres of yard assembly space capable of supporting large modular loads with direct access to a roll on roll off barge slip suitable for ocean going barges.

We employ over 200 full and part time highly skilled personnel with employment surging to 350 for large modular projects. In addition to direct employment, we contribute to thousands of community jobs through suppliers and subcontractors that support our projects. Thompson Metal Fab, Inc has been operating at our current location in Vancouver, WA since the mid 70's and we are celebrating our 85th year in business overall.

The ability to ship large unique structures via barge to Alaska, Hawaii, and the entire west coast of the US is a major asset to our business operation and markets. It allows us to compete with and succeed against overseas suppliers as well as give us a competitive advantage over inland based competition. The capacity to build large structures and transport them over waterways and ocean, combined with diversification of skills, has allowed TMF to succeed during downturns in individual markets. We are an important infrastructure supplier to Alaska which frequently relies on delivery via ocean going barge. Additionally, we are a major bridge fabricator for Washington, Oregon, and Northern California. TMF is also an important contractor to the US Army Corp of Engineers supporting lock and dam needs up and down the Columbia River and Snake River waterways.

Reducing the vertical clearance of the Columbia River Interstate Bridge, downriver from TMF, to 116' would severely restrict our ability to operate in our current and future markets. The impact to our business where barge transport is required would be devastating and cause irreparable harm to Thompson Metal Fab, Inc., resulting in significant loss of jobs both direct and indirect. Our future ability to participate in work on the North Slope of Alaska and anticipated offshore wind energy would be eliminated. Despite the proposed vertical height of 116', the practical vertical limitation for our work would be closer to 100' when you take into consideration recommended cargo clearance and variations in river flow and tidal effect.

The ability to transport large fabrications by water at the current vertical bridge clearance is vital to TMF, although our usage of the lift span is not one of frequency but need for capability. There may be years when we have one lift or none, and there may be years when we have four or five. What is important to note is that the amount of labor and material that went into the structure (either North Slope oil rig or offshore wind tower platform) being transported is significant. It may take 18 months and hundreds of thousands of manhours for us to need one lift. In response to your notice, that work would not be at TMF and contributing to our economy if it were not for clearance at current vertical limits.

Our mission and business at TMF have not changed since the previous survey and analysis of the CRC team several years ago. I have included the packet we supplied to the current Interstate Bridge Replacement team for their River User Survey last year, that outlines TMF's historic, current, and future river navigation needs. There are multiple examples of past and current river usage as well as specific projects in markets that will need our capabilities as they exist today.

Please contact me if you have any questions or need further clarification on the information provided.

Best Regards,

John B. Rudi
President/CEO
Thompson Metal Fab, Inc.
[redacted]

THOMPSON
METAL FAB

Interstate Bridge Replacement Project

Thompson Metal Fab – Impact Statement

May 26, 2021

Presented by John Rudi
Owner, President – Thompson Metal Fab

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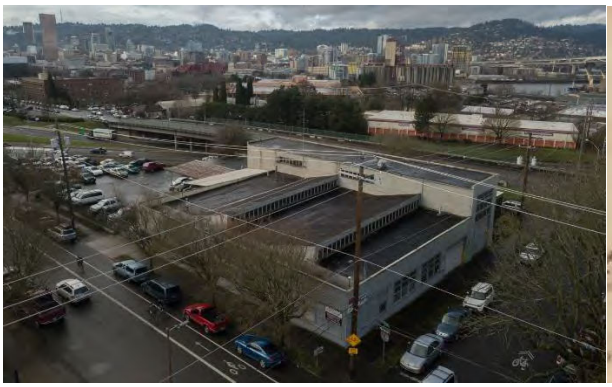
INTRODUCTION

The history of Thompson Metal Fab includes two major influences, the opening of the Interstate Bridge in 1917, and the opening of the Columbia Business Center *(originally Henry Kaiser's Vancouver Shipyard)* in 1942. Over the years, Thompson Metal Fab (TMF), the Columbia Business Center (CBC) and the Interstate Bridge will see their history evolve due to the changing needs of the region, rapid population grown, and dynamic industrial development. For these same reasons, their history also begins to connect, and their futures are tied together.



The original Thompson Metal Fab facility, shown in 2018. Thompson moved from this location and to Vancouver in the early 1970's. The old facility has since been demolished, making way for the brand new Meyer Memorial Trust building.

Original span of the Interstate Bridge opened 1917 – shown here in 1931.

The original Interstate Bridge (current day northbound span) was completed and opened in February of 1917. Upon completion of this span, travelers could go from Canada to Mexico on one complete roadway. This was not only a big accomplishment for the country, but it was also an opportunity for growth, specifically in southwestern Washington. At the time the bridge was opened, there were approximately 250,000 people in Portland, compared to the 12,000 in Vancouver. The new bridge would provide opportunity for dynamic population movement, economic growth, and forever connect not only two states, but two communities. To satisfy the needs of this expanding community, a second 'twin' span was eventually completed and opened in 1958.

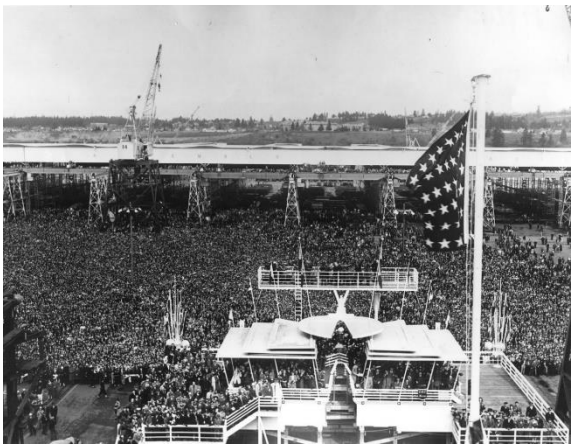
With a clearance of 72 feet, most river barges can pass under the bridge without impact when the drawbridge is closed. This is not the case with large industrial projects, like those manufactured currently by Thompson Metal Fab, or for large vessels, like the Liberty and Victory ships from the early 1940's. At full height, the current lift span can accommodate 178' from the water to the underside of the bridge. This "air gap" allows very large loads to pass upriver and downriver and has driven the development of upstream industrial areas such as the Columbia Business Center, originally known as Henry Kaiser's Vancouver Shipyard.

COLUMBIA BUSINESS CENTER *(former Kaiser Vancouver Shipyard)*

Building 40 and 41 of current day Thompson Metal Fab is shown prominently in the middle of this picture. At the time this picture was taken (circa early 1940's) the building and entire industrial area would have been known as Kaiser's Vancouver Shipyards.

At nearly 200-acres, Kaiser's Vancouver Shipyard began production in early 1942 with an initial payroll of 38,000 workers. This facility, along with two in Portland, produced 752 ships during WWII and peaked at 97,000 workers in total. Many of these workers migrated from other parts of the country and is part of the reason why the Portland/Vancouver area saw such a big jump in population at this time. The development of these shipyards certainly contributed to the need for a new span (eventually built and completed in 1958) and the need to modify the original span, completed in 1960. For perspective on what these facilities were able to produce, the construction on the first Liberty ship took 131 days in 1941. By 1943, Kaiser workers were averaging a completed Liberty ship in 42-days and three ships were being completed each day. Record production for a completed ship was 10-days, although that production was bested by one of the Kaiser facilities in Richmond, CA *(4-days, 15-hours, 29-minutes)*.

[1943] Escort carriers at the Vancouver Shipyards (current day Thompson Metal Fab)



75,000 people (largest crowd in Clark County's history) assembled on April 5, 1943 to witness first lady Eleanor Roosevelt christen the 'Alazon Bay' escort aircraft. Current day Thompson Metal Fab is seen prominently in the background.

drive opportunity to the Columbia Business Center as oil companies looked for fabricators to build "jacket liners" for new offshore wells. The facility could support the work on the massive infrastructure and the bridge was high enough to allow the jacket liners to be shipped downstream.

The 1960's and 1970's saw the construction of new dams on the Columbia River and Snake River in addition to the development of major oil fields in Alaska (i.e. Prudhoe Bay). Ongoing work on the US Interstate Highway System also provided opportunity for new bridges, including four highly visible bridges in Portland: Morrison Bridge (1958), Marquam Bridge (1966), Freemont Bridge (1973), and the Glenn L. Jackson Memorial Bridge (1982). These would be opened to accommodate a shifting population and to relieve pressure on traffic crossing the Interstate Bridge.

After the war ended and the need for shipbuilding diminished, learning how to leverage these 'abandoned' facilities for future industrial growth was important. The size of the facility at the Vancouver Shipyard was simply greater than most fabrication shops of the day. Even now, it remains one of the largest fabrication facilities on the West Coast. The sheer size of the building, access to a large yard, and location to a major waterway made the facility at the future Columbia Business Center an extremely attractive option for the large infrastructure needs that were coming.

The Portland/Vancouver Metro area became highly industrialized by the 1960's, driven by the ability of the Columbia Business Center and companies such as Thompson Metal Fab. This strong local economy centered around logging, pulp & paper products, and maritime transport on the Columbia River; and stimulated additional growth in the region. The California oil boom would also

Infrastructure for the California offshore oil fields being manufactured at the Columbia Business Center in 1967. Thompson Metal Fab would begin operations here a few years later in 1973.

THOMPSON METAL FAB

In 1937, "Pudge" Thompson opens 'Thompson Metal Fab' at 2405 Vancouver Avenue in Portland, OR. The opening of his facility comes 20-years after the opening of the Interstate Bridge while also pre-dating the second span by 20-years.

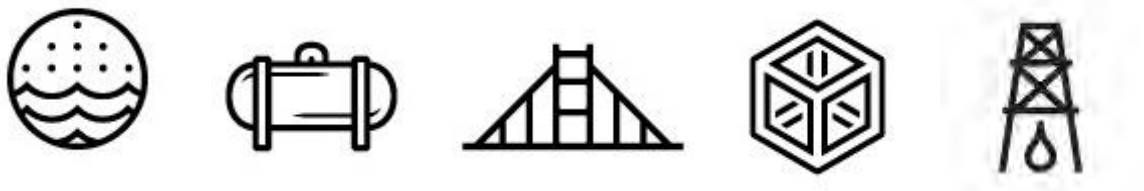
Original marketing display of the Thompson Ice Tongs

The origin story of Thompson Metal Fab is a humble one, especially compared to the work they do today. Pudge and his craftsmen manufactured lightweight metal products for the dairy and timber industries. One product, the Thompson Ice Tongs, held US patient #D206,091 and a quick Google search shows that the Thompson Ice Tongs are still selling online to this day. Thanks in part to the WWII war effort, expansion of TMF continued during the 1940's and 1950's; mirroring the growth of the community it served and the new industrial opportunities.

In 1973, after 36 years, Pudge Thompson sold his company to Harder Mechanical, whose story is like TMF's. Harder began as a small local plumbing contractor who was founded in 1934. A few years later they reinvented themselves so they could build housing for the workers at the Portland area shipyards during WWII. As the region continued to see growth, so did Harder who saw the acquisition of Thompson Metal Fab as a way to expand their capabilities and stake a claim on some of these emerging industries (i.e. hydroelectric dams). Shortly after the acquisition, the original Thompson Metal Fab facility (Portland, OR) was closed for good, and all operations were moved to the old Kaiser Shipyard in Vancouver, WA – a facility well suited to support the large projects Harder Mechanical would earn as they grew and expanded.

Thompson Metal Fab would transfer ownership again in the early 2000's with even more emphasis on how to maximize the capacity. The size of the facility requires TMF to be a diversified business and one with experience in multiple disciplines, including:

Marine/Hydro **Tanks/Vessels** **Bridges** **Modular/Structural** **Oil & Gas**



Since the early 1970's, TMF has completed countless projects while working over 10-Million man-hours *(estimated)*. The following list showcases some of the completed projects over the last 40+ years. In each case, transportation by barge was required (either by design or necessity), and in many cases the load passed under the Interstate Bridge.

Projects noted with (*) were not completed by Thompson Metal Fab but are on this list to showcase examples of other mega projects where a facility like Thompson's was required (Big shop, assembly yard, barge loading capabilities)

MARINE/HYDRO

The Dalles Dam, Downstream Navigation Lock Miter Gates, Columbia River, WA/OR, USA [2011]

Two Miter Gates were manufactured, where each gate measured 52' W x 106' L and weighed 1-Million pounds each. Due to navigational lock closures on the Columbia River, an aggressive fabrication and delivery schedule was required which required a fabricator with ample space and ability to load a barge. Picture to the right shows one gate getting ready to be loaded on the barge. Seen in the background is Parker Drilling Rig 272 & 273. Those rigs would ship just a few months after this load.

Lower Monumental Dam, Downstream Navigation Lock Lift Gate, Snake River, WA, USA [2010]

The finished weight of this structure was 1.5-Million pounds and would ship to the jobsite by barge in three segments. The final gate is 88' W x 84' H

Ice Harbor Dam, Removable Spillway Weir, Snake River, WA, USA [2005]

This removable spillway weir is designed to move juvenile fish more efficiently through the dam spillways. The unit measured 70' in width x 68' in height x 105' in length. It weighed 950-tons and is taller than Thompson's facility! The weir was completely fabricated at TMF and then transported by barge to Cascade General for repositioning before shipping to the jobsite on the Snake River.

Lower Granite Dam, Removable Spillway Weir, Snake River, WA, USA [2001]

The removable spillway weir is designed to move juvenile fish more efficiently downstream through the dam spillways. The weir was 83' wide x 61' deep x 115' long and weighed approximately 1,000-tons. The weir was completely fabricated at TMF and then transported by barge to Cascade General for repositioning before shipping to the jobsite on the Snake River.

Esperanza 124 MW Power Barge [1999]

Recently retrofitted in 2017 in Panama, it was originally fabricated in 1999 by Thompson Metal Fab, and transported to Cascade General in Portland, OR for final assembly and functional testing. The barge measured 105' wide x 30' deep x 284' long with a weight of 1,800-tons. The completed barge was loaded on a 400' L x 100' W barge for delivery to Cascade General.

Golmar Explorer Ship Conversion [1997]

In 1997, Thompson fabricated multiple items for the infamous Golmar Explorer ship which was developed for the CIA and at the direction of Howard Hughes. By the mid-1990's the ship had changed hands a few times over and was in the process of being converted into an oil drilling vessel. TMF fabricated two double-bottom sections, four thruster tubs, vessel exhaust stacks, and manifold systems for this project. Completed components were transported by barge from TMF to Cascade General Shipyard.

John Day Dam, Upstream Navigation Lock Gate, Columbia River, WA/OR, USA [1991]
This gate was fabricated at the Columbia Business Center. The gate measured 28' deep x 80' high x 120' wide and weighed 105-tons. It was transported standing (80' high) for installation purposes.

Pacific Marine Hull Fabrication, Honolulu, HI, USA [1989]
TMF fabricated a 365-ton "SWATH" (Small Waterplane Area Twin Hull) excursion vessel. The fabrication consisted of twin cigar-shaped hulls that were 9' in diameter and 132' in length with vessel beams measuring 53'. Thompson's location adjacent to the Columbia River proved valuable for launching the vessel. After sea trials, the "Navatek" vessel headed to Hawaii. The vessel is still operating today.

Christensen Shipbuilders, Dry Dock, Vancouver, WA, USA [1987]
210' long dry dock was fabricated by TMF, including all walls, deck, ballast tanks and piping

Columbia River Barge Conversions [1979-1971]
Thompson converted barges to carry wood chips in support of the pulp and paper mills. The converted barges were fabricated to ABS and USCG standards. Projects were installed at our adjacent dock and barge facilities.

Alaska Ferry Conversion [1973]
Thompson Metal Fab supplied an exhaust funnel, solarium structure and modular subcomponents for the passenger ferry that travels the Inland Passage to Alaska. The existing ferry was cut in half and lengthened, with TMF fabricating all components for this major renovation. All items delivered by barge to the shipyard.

Other Examples Include:

- WSDOT Coleman Dock Improvements [2023] *
- Ballard Lock & Dam, Navigation Lock Center Miter Gates, Lake Washington, WA, USA [2022] *

- John Day Dam, 150-Ton Gantry Crane, Columbia River, OR/WA, USA [2022] *
- McNary Dam, Intake Bulkhead Gates, Columbia River, OR/WA, USA [2022] *
- Port of Alaska Petroleum & Cement Terminal Expansion, Anchorage, Alaska, USA [2021]
- Ward Cove Ferry Dock Expansion, Ward Cove, Alaska, USA [2020]
- WSDOT Mukilteo Dock Improvements, Mukilteo, WA, USA [2020] *
- The Dalles Dam, Upstream Navigation Lock Radial Gate, Columbia River, OR/WA, USA [2016] *
- Lower Granite Dam Expansion, Snake River, Washington, USA [1987]
- Revelstoke Dam, Columbia River, British Columbia, Canada [1984] *
- Bonneville Dam Expansion, Columbia River, Oregon, USA [1981] *
- Brownlee Dam Expansion, Snake River, ID/OR, USA [1980] *
- American Falls Dam Replacement, Snake River, ID, USA [1978] *
- Ice Harbor Dam Expansion, Snake River, Washington, USA [1976] *
- Grand Coulee Dam Expansion, Columbia River, Washington, USA [1974] *
- Mica Dam, Columbia River, British Columbia, Canada [1973] *
- John Day Dam, Columbia River, WA/OR, USA [1971] *
- Little Goose Dam, Snake River, Washington, USA [1970] *
- Lower Monumental Dam, Snake River, Washington, USA [1969] *

TANKS/VESSELS

<u>Phillips 66 Prefractioner Tower, Rodeo, CA, USA [2015]</u>

The 200-ton tower stretched 126’ Long and transitions from 10’-6” diameter at the smallest to 17’-0” at the largest. The vessel was manufactured in three separate sections before being married together at Thompson’s shop. The vessel shell and heads are made from clad plate which provides the necessary strength while also providing the required corrosion protection on the interior. For final acceptance, nearly 120,000 gallons of water was pumped into the vessel for a leak test. The vessel was pressurized over a period to ensure that all welds were water-tight.

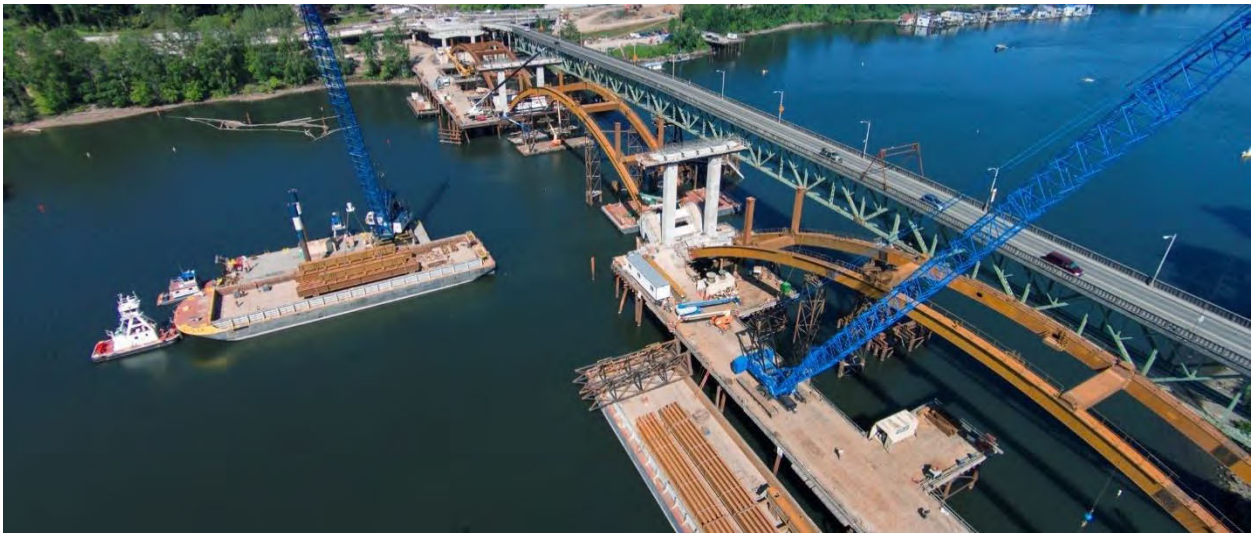
REC Solar Grade Silicon Project, Moses Lake, WA, USA [2007]

Thompson Metal Fab manufactured a total of 10 process vessels for the solar grade silicon industry. The project included four vessels which required barge transportation due to their size. Those vessels were 150" ID x nearly 120'-0" L and weighed over 200,000 LBS/ea. Vessels were barged to Pasco, WA and then shipped over the road to Moses Lake.

BRIDGE

Sellwood Bridge, Portland, OR, USA [2016]

Thompson's scope of supply included fabrication of all major bridge components: Arches, Arch Cross-frames, Vertical Spandrels, and the Bridge Deck Steel. Over 5,000-tons in total. The distinctive feature of the bridge are the three arches which cover 1,275' of the total 1,976' crossing. Each arch was fabricated in segments, with each segment 100' long. Because of the project's location on the Willamette River, steel was delivered to the jobsite with seven barge loads. Multiple barges can be seen here with incoming steel deliveries.



Bay Bridge Connector, Bay Area, CA, USA [2006]

TMF painted two orthotropic tub girders that were fabricated at the Columbia Business Center. Each weighed more than 1,600-tons and measured over 200' L x 80' W. Girders were transported by barge to the Bay Area for erection.

Richmond San Rafael Bridge, Bay Area, CA, USA [2004]

10,000 tons of structural bridge steel for the substructure was supplied for a seismic retrofit. Total fabrication took three years to complete. Larger components were transported by barge and direct to the jobsite.

Tri-Met Terry Moore Pedestrian Bridge, Portland, OR, USA [1996]

Fabricated at the Columbia Business Center, TMF painted the pedestrian bridge spanning HWY 26 near the HWY 217 junction. Completed sections were shipped by barge to a nearby location before being trucked to the jobsite.

1st Ave & Duwamish Bascule Bridge, Seattle, WA, USA [1996]

Completed truss sections for this project were fabricated at the Columbia Business Center, painted by Thompson, and assembled at the facility. Transportation to the jobsite in Seattle was done over the water, by barge.

Nimitz Freeway, Bay Area, CA, USA [1995]

This project consisted of (13) curved tub girders for the reconstruction of the Nimitz Freeway in the Bay Area. Girders were fabricated at the Columbia Business Center and painted by TMF. The total project weighed 6,000-tons with the largest girders weighing 450-tons; 50' W x 250' L. This project required four barges for delivery to jobsite..

I-90 East Channel Bridge, Seattle, WA, USA [1986]

Trapezoidal tub girders that varied from 98' to 198' in length and weighed between 60 and 200-tons each were fabricated at the Columbia Business Center and painted by Thompson Metal Fab. Girders were pre-assembled and completed sections loaded on a barge for transport to Lake Washington.

Other Examples Include:

- BNSF Bridge 66.4 Replacement, Cook, WA, USA [2020] *
- BNSF Bridge 58.8 Replacement, Home Valley, WA, USA [2019] *
- Wittpenn Bridge, Jersey City, NJ, USA [2017] *
- Sauvie Island Bridge, Portland, OR, USA [2004] *
- Glenn L. Jackson Bridge, WA/OR, USA [1982] *
- Freemont Bridge, Portland, OR, USA [1973] *

MODULAR/STRUCTURAL

Intel Expansion, Hillsboro, OR, USA [2010's - Present]

Expansion at the Intel facility in Hillsboro has been going on for some time and Thompson has supplied numerous modular structures in support of their effort. In 2020, TMF shipped the largest modules to date, buildings that were 44' W x 97' L x 16' H. Due to their size, the buildings could break apart in half, but still required a barge to get from TMF's facility to the jobsite as shipping over the road was not an option.

Caltrans, East Tie-In Project, Bay Area, CA, USA [2008-2009]

Thompson was selected by Caltrans (owner) to work with TY-Lin (designer), CC Myers (contractor) and DCCI (erector) to fabricate 3,100-tons of temporary steel to provide detour for the Oakland Bay Bridge at Yerba Vista Island. Thanks to the size of their facility TMF could meet the 'expedited' schedule requirement for this project. Major components required four barge loads from TMF's facility to the job-site in California. Project was completed in 2009.

OHSU Tram, Portland, OR, USA [2006]

TMF fabricated the center support tower, the lower station, and the upper station for the tram project. The major components were transported by barge from TMF to the jobsite in Portland, OR where they were offloaded and erected.

The team at Thompson Metal Fab standing in front of base of the iconic Portland Aerial Tram mid-tower. The tram is located at the OHSU hospital in Portland and spans across I-405. The tower base is over 40' high as shown in this picture.

Alaska Gold Mining Project, Nome, Alaska, USA [2005]

Thompson fabricated hoppers, grizzly grates, ball mill chutes, structural supports, modification of the ball mill, and other mining equipment for this project. TMF's facility was used for the marshaling yard and the load out point for all equipment and structures. Delivery was made via barge to Nome, AK.

Boeing Delta IV Launch Table, Vandenberg AFB, CA, USA [2003]

The 98' long x 33' high x 46' wide launch table weighed 580-tons. The project also included large flame deflector components which weighed up to 120-tons. The launch table and flame deflectors were fully assembled at the TMF facility and transported by barge to Vandenberg Air Force Base in California. It was then off-loaded an installed at the launch site.

PGE Decommissioning Trojan Nuclear Reactor Project, Rainier, OR, USA [1998]

TMF fabricated a 120-ton transport structure and 5" THK shielding enclosures. The completed structures were shipped by barge to the jobsite where the decommissioned reactor was loaded. The entire load was then shipped by barge to the final storage location at Hanford – Richland, WA.

Powell River Paper Company, British Columba, CANADA [1991]

Thompson supplied the fabricated steel for a Chlorine Dioxide Module that measured 35' wide x 76' high x 35' long. This module weighed 350-tons and was transported by barge in the vertical position from TMF's facility in Vancouver, WA to the Power River Paper Company in British Columbia, Canada.

Georgia Pacific Wood Chip Material Handling System, Toledo, OR, USA [1973]

TMF fabricated six 280' tube conveyor sections and all support towers for this project. The completed structures were transported by barge to Toledo, OR and installed.

Other Examples Include:

- Data Centers, The Dalles, OR, USA [2010's – Present] *
- Data Centers, Hermiston, OR, USA [2010's – Present] *
- Pre-Heater Tower, Richmond, British Columbia, CANADA [1997]
- Portland Expo Center, Portland, OR, USA [1995]
- Bulk Material Handling System, Sacramento, CA, USA [1993]
- Newport Bay Floating Restaurant, Portland, OR, USA [1986]

OIL & GAS

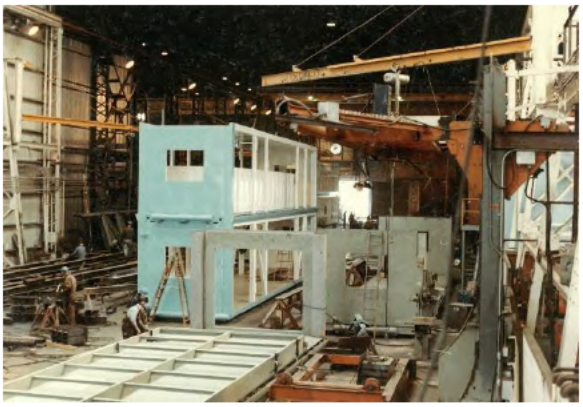
The turnkey modular service TMF offers today reflects what kicked off in the 1980's. By that point work at Prudhoe Bay was ongoing, but the infrastructure needed to support the development was still in process. In 1984, Thompson supported ARCO by manufacturing two 96-room housing modules. Each module was 40' wide x 46' high x 80' long. In addition, two Utilidor Modules were manufactured *(each 10' W x 22' H x 24 L)*. In 1985, more infrastructure was sent to ARCO; these 'bases' were 33' wide x 100' long x 10' high. Thompson also supported Conoco's Milne Point unit in 1985 with the supply of (10) module bases and (11) skids. These structures weighed anywhere from 20 to 270 tons each, with a max dimension of 64' W x 123' L x 12' H. Manufacturing structures of this size and delivering complete to the jobsite seems strange in the lower-48, but given the expanse of the North Slope, it's well suited to receive large infrastructure without other physical limitations to navigate. Additionally, with as fast as the development was happening, there was a value placed on 'set it and leave it' projects; things that could be installed and immediately put-to-use.

Massive platforms for the Alaska oilfields being fabricated at Thompson Metal Fab in the mid-1980's. The platforms nearly took up the entire width of a bay (80')

The platforms (seen left) were delivered by barge to Alaska where high capacity trucks and dollies (shown above) off loaded the structures for delivery to the jobsite.

Thompson's experience in supplying the oil fields eventually led to connections with the drilling contractors. The drilling contractors work on behalf of the owners to drill production wells and test holes as part of the exploration process. Drillers operate large equipment (known as rigs) to drill the holes. Thompson's first experience with rigs started in the late 1980's with Pool Arctic *(now Nabors Drilling)* who was a drilling contractor working on Alaska's North Slope. At one point, Pool Arctic operated the largest fleet of drill rigs on the North Slope. When TMF began working for Pool, they were looking to expand their fleet to meet market demand. This required retrofitting current rigs due to advances in equipment technology and drilling conditions that surpassed the capability of their rigs. Retrofitting works the same way as a new-build, only backwards. In a retrofit, the rig is placed on the barge and then shipped to a location large enough to receive it over the water and with enough yard space to accommodate the work. There are very few facilities on the West Coast who can accommodate this. Retrofits are just as attractive to TMF as new-builds. During a retrofit it is not unusual for some level of "rigging down" to happen and for structures to be placed in the shop. In that circumstance, it is very attractive to contractors to work with a facility large enough to handle these structures and keep them under the roof and out of the elements.

AADCO merged with Pool Arctic in 1983 and provided the rig shown above as part of the merger. This rig would be retrofitted by TMF.



Modular fabrication at Thompson Metal Fab for a Pool Arctic retrofit. The modules shown here represent the scale of a 'truckable' module, typically 12' H x 10' W x 40' L

Traditionally, drill rigs are built by manufacturing a series of truckable modules. These modules are fully assembled at the manufacturer's yard for verification, testing, and commissioning. Upon approval, the rig is completely disassembled for transportation to the jobsite. "Rigging up" is the process by which all these truckable modules are then reconnected together and recommissioned. Depending on the size of the rig, it is not unusual for 200 truckloads to be needed to move from the manufacturing location to jobsite. The process of putting a rig back together in remote locations can take months and cuts into production time. The ability to offer a turnkey service and integrate work in Thompson's shop and in their yard ultimately saves money in the long run – and contractors and owners have come to expect the capacity TMF can offer. During the early development of Prudhoe Bay in the Arctic, machinery and field services were limited and getting the required equipment to the jobsite required creative solutions. Field work is expensive and risky; and often there is limitations to what can be performed. Thompson can build larger modules for delivery, which provides a distinct advantage by minimizing costs in the field and minimizing risk.

Parker Drilling was one of the first contractors who recognized that one solution to the problems on the North Slope was to simply to deliver a *bigger* rig. A bigger rig would be capable of holding more robust equipment which would allow for drilling longer, bigger holes for greater production. The benefit of drilling longer holes is that you do not need to move the rig from pad to pad as frequently; you can cover a lot more ground from just one spot. They understood the importance of downtime and the full capacity of what TMF could offer with regards to turnkey modular fabrication. The design for Parker Drilling's Rig 245 swapped out the multiple, smaller, truckable

A large module for Parker Drilling Rig 245 moving from TMF's shop to their yard for assembly. Seen in the background is the mast and substructure of this massive drilling rig.

Rig 245 shown here at the assembly yard. When fully raised, the mast hangs high in the Vancouver, WA skyline.

modules and consolidated them into fewer 'mega modules.' Less modules simply take less time to put back together in the field. What could be 4-6 months in field work could now be up and running in weeks. Also, by eliminating trucks, the risk of loads being damaged during transport is reduced dramatically. Parkers' vision of 'mega modules' required a facility that offered a few things: a big shop, big yard, skilled workforce, access to water for shipping, and a logistically friendly location.

Parker Drilling Rig 245 being 'rigged up' at Thompson Metal Fab's yard. This yard space is immediately adjacent to the manufacturing facility and to the roll-on/roll-off barge slip. The ability to offer turnkey projects and delivery via water has given Thompson Metal Fab an advantage in the marketplace.

Drilling equipment has long been manufactured in Houston, Louisiana, and other Gulf state locations. These facilities manufacture the truckable modules and often the large offshore platforms. They certainly have the shop, yard, workforce, and access to water – but they do not have a strategic location to Alaska when it comes to logistics. To get a barge from the Gulf to the North Slope requires passage through the Panama Canal just to get from one side of the continent to the other. The added time for shipping and the added cost of voyage does not justify the mega module concept. What is needed is a manufacturer in the Pacific Northwest. TMF's location at the old Kaiser shipyard in Vancouver, WA provides the space and direct access to a deep-water barge slip with roll-on/roll-off access. The combination of a heavy-industrial construction facility and a support yard with marine transportation capability is an important asset to the region's industrial job base and has potential to attract large job producing projects. This capability has enabled TMF to stay competitive in a business that has largely moved overseas.

Becoming a proven West Coast manufacturer of drilling equipment gave drilling contractors an option that was not there previously. By entering the market, engineers could now extend the limits of their design and present solutions that were attractive to both contractors and owners who were seeking to replicate what Parker did with Rig 245, the first mega-rig on the North Slope. Among the design variables that has always been taken into consideration are the shipping clearances between our facility and the North Slope of Alaska. In that distance, there are three bridges which loads must pass under: The Interstate Bridge, the Lewis & Clark Bridge, and the Astoria-Megler Bridge. Of those three, the Interstate has the lowest total clearance, but is currently sufficient to meet the requirements of transporting mega modules.

Doyon Drilling Rig 25 shown on the barge in the foreground. Due to the size of the rig and its six mega-modules, two barges were required for delivery to Alaska's North Slope. The background shows the remaining modules for Rig 25, in addition to Parker Drilling's AADU Rigs (Rig 272 and Rig 273)

Thompson's greatest competitive advantage in earning business with the drilling contractors is their ability to ship completed, commissioned, turn-key 'mega modules' to the jobsite. If that advantage is eliminated, they will be priced out of the market. In addition to competing against the Gulf states, they actively compete with Canadian shops in Alberta. Because of the exchange rate, those facilities have a 30% pricing advantage, all other things being equal. That is the magnitude of the shipping advantage they have at Thompson. Contractors are willing to pay a

Picture of the Interstate Bridge in 2011 showing both the original Northbound span (background) and the second span (foreground) which opened in 1958 to traffic in both directions. In 1960, the second span was dedicated to Southbound traffic only. (Photo shows TMF manufactured drill rigs, AADU Rig 272 & 273 for Parker Drilling)

premium to avoid truckable modules manufactured in interior Canada or in the Gulf. It is the Contractor's advantage in the long term to have mega modules as their risk is lower, their down time is lower, field erection and trucking costs diminish, etc. Please note, these mega modules can only have their loads diminished so much (because of shipping clearance issues, etc.) before the concept no longer makes sense and the design is forced back to a more traditional build plan.

PROJECT EXAMPLES:

Hilcorp Innovation Rig, North Slope, Alaska, USA [2016]

The Innovation Rig is the next generation of drilling equipment. At nearly 1.5-Million LBS of steel, this rig consists of multiple modules and was built up to 50' H in TMF's shop before moving to their yard for final fit-up. At 9-months, this was the fastest rig build in Thompson's history, a true testament to their size and capability.

Parker Drilling AADU Rig 272 & 273, North Slope, Alaska, USA [2011]

Each drilling rig was comprised of three main modules. The Mud Modules weigh 600-tons, the Drill Modules weigh 700-tons, and the Utility Modules weigh 460-tons. The Mud and Utility Modules are 48' wide x 55' high x 99' long. The Drill Module is 76' high with the mast in the lay-down position.

Doyon Drilling Rig 25, North Slope, Alaska, USA [2010]

4-million LBS of steel and aluminum fabricated for Rig 25, a project where TMF also acted as the General Contractor. TMF managed all rig-up activities including mechanical, electrical, and functional checkout. This rig consisted of six primary modules: Power Complex (550-tons, 56' L x 40' W x 42' H); Drill Complex (560-tons, 96' L x 37' W x 40' H); Pipe Complex (560-tons, 68' L x 47' W x 25' H); Mud Complex (550-tons, 68' L x 40' W x 49' H); Pump Complex (560-tons, 64' L x 40' W x 52' H); Casing Complex (500-tons, 60' L x 56' W x 40' H). The 26' x 25' Mast extends to 148' L.

Parker Drilling/British Petroleum Liberty Rig, North Slope, Alaska, USA [2009]

This drilling rig shipped from our facility to the North Slope of Alaska in July 2009. TMF furnished approximately 5.5-milion pounds of fabricated steel. The rig was the world's largest land-based rig at the time of manufacturing and consisted of three large modules. The Drill Module was 58' W x 98' H x 68' L, weighing 900-tons. The Pipe Barn module was 158' W x 45' H x 170' L, weighing 2,560-tons. The Drill Service Module was 50' W x 48' H x 177' L, weighing 2,600-tons.

Pool Arctic Rig 6, North Slope, Alaska, USA [1998]

The Rig 6 project was a retrofit of the existing rig and included all new structural framing in addition to new mechanical components for the moving system. At the time of manufacturing, it was reported by the tire manufacturer to be the largest rubber tire vehicle in the world. Nicknamed 'Radio Flyer', this backbone of this rig is twin 6' x 10' box girders which support the drill floor and mast, and transfers load to the substructure.

Nordic Calista Rig 3, North Slope, Alaska, USA [1998]

In 1998, TMF completed and delivered Modular Mobile Oil Drilling Rig 3 to Nordic Calista. The rig includes 850-tons of fabricated steel, it measures 45' wide x 78' high x 110' long. The rig was transported by barge to the North Slope of Alaska.

Parker Drilling Rig 245, North Slope, Alaska, USA [1990]

In 1990, TMF fabricated a self-propelled mobile oil drilling rig. The drilling module was 43' wide x 78' high x 150' long and weighed 3,000-tons. The utility module was 40' wide x 58' high and 130' long, weighing 1,500-tons. The cutting module is 30' wide x 30' high x 40' L, weighing 350-tons. The completed drilling rig was transported by ocean-going barge from TMF's facility to the North Slope.

ConocoPhillips Milne Point, North Slope, Alaska, USA [1987]

3,400-tons of fabricated modular steel structures were supplied to ConocoPhillips. This took three ocean-going barge loads to deliver to Alaska.

ARCO Operation Center Housing Expansion, North Slope, Alaska, USA [1985]

Modular superstructures (40' W x 65' H x 80' L) were fabricated along with bases and decking housing modules. Completed modules were loaded onto a barge and transported direct to the North Slope.

Other Examples Include:

- Crowley, Monopod Pile, Cook Inlet, Alaska, USA [2014]
- Saxon Rig 147 Retrofit, Cook Inlet, Alaska, USA [2013]
- Saxon Rig 169 Retrofit, Cook Inlet, Alaska, USA [2013]
- Kuukpik Rig 5 Retrofit, North Slope, Alaska, USA [2005]
- Pool Arctic Rig 9, North Slope, Alaska, USA [1999]
- Nordic-Calista Rig 1 Retrofit, North Slope, Alaska, USA [1997]
- Pool Arctic Rig 4, North Slope, Alaska, USA [1994]
- Petro Star Refinery (Valdez), Alaska, USA [1993] *
- Pool Arctic Rig 3, North Slope, Alaska, USA [1990]
- Petro Star Refinery (North Star), Alaska, USA [1985] *
- Trans Alaska Pipeline System (TAPS), Alaska, USA [1977]
- Prudhoe Bay, Alaska, USA
    - *Discovered (1968), Start of Production (1977), Peak Production (1988)*
- Cherry Point Refinery, Washington, USA [1971] *
- Cook Inlet Monopod, Cook Inlet, Alaska, USA [1970's] *
- Kenai Refinery, Alaska, USA [1969] *
- Maintenance on California refining facilities
- Maintenance on Washington refining facilities

With a structural height of 126', this pile template for a monopod in the Cook Inlet (Alaska) is one of the largest structures to ship from the Columbia Business Center in the last 40-years. Thompson Metal Fab manufactured piling for this project, delivered in 2014.

Taken in the early 1970's, the photo above shows Thompson Metal Fab shortly after closing the original facility in Portland and moving to Vancouver. Thompson added fiberglass roofing and walls to bays 5 through 9 to create an enclosed space. The land has been developed quite a bit in the last 40-years (including improvements to the roll-on/roll-off barge slip), but the building remains virtually the same.

LOCAL BENEFIT & LOOKING AHEAD

Because of Thompson's 40-year reputation, logistical advantage and modern quality programs required, they have a distinct benefit. Loss of that logistical advantage due to a diminished shipping clearance (or other) is not something they could replace. Earning this business is a tremendous benefit to Thompson, their employees, and their local community. For example, any one rig project is equivalent to one year of revenues, in addition to hundreds of direct high wage jobs, as well as work for hundreds of local small businesses.

Due to the magnitude of work, contractors often mobilize to Vancouver to manage the construction. This includes management, engineers, and other personnel to ensure that projects are delivered on time. This staff of people stay long-term in local hotels, rent from local citizens, spend entertainment dollars with local small businesses, and are an economic benefit. They not only employ the staff at TMF, but they also employ local electricians, machinists, painters, millwrights, pipe fitters, hydraulic operators, boilermakers, sheet metal workers, and other trades. This work also supports various apprentice programs which train the next generation of trade workers. Loss of this total benefit cannot be replaced.

Local businesses see boosts in revenues when major job producing projects are brought to the Columbia Business Center. Due to the nature of these large projects, stakeholders often move management teams to Vancouver to oversee manufacturing.

History has shown us that building a new link between Vancouver and Portland will bond our communities together and provide opportunity for economic growth and expansion. We also see that there is a correlation between the bridge, the growth of our community, and Thompson Metal Fab. The need for large-scale fabrication remains and markets that require TMF's services show no sign of slowing. There is potential for an industrial rebirth, one that mimics the industrial expansion of the 1950's through 1970's. While it is yet to be seen at the time of this writing, the federal government will at some point pass an infrastructure spending bill, which intends to replace our aging and deteriorating bridges, dams, and other critical works. Just as building these original structures kept generations of people working, so will the effort to replace these structures.

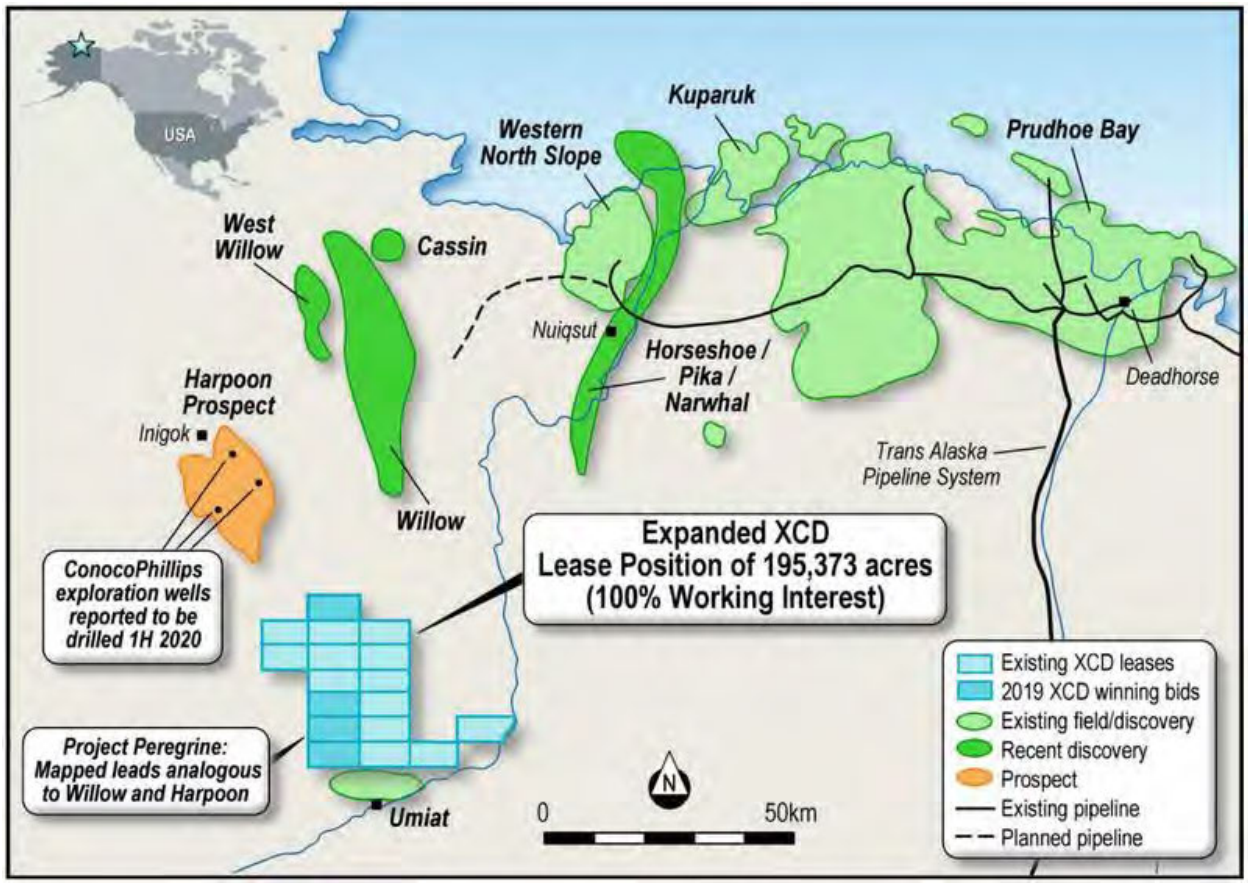
Thompson is encouraged by the commitment made to develop renewable energy sources. TMF has directly supported this effort for decades by manufacturing equipment that grows polysilicon crystals used in the development of solar panels. They have even been successful exporting domestically manufactured polysilicon equipment to countries such as China. Being a part of clean and renewable projects is something TMF does every day, thanks to the nature of their business. Steel is the most recycled material on Earth and steel products are 100% recyclable at the end of their useful life. Once produced, steel can be continually recycled into a new steel product without deterioration in product quality. Even the byproducts of steel work can be reused. Weld slag is used in cement, road construction, fertilizers, and hydraulic engineering. Process gasses are used to produce heat and electricity. Metal oxides can be recovered from steel making dust. Steel's inherent durability and recyclability make it an ideal fit for a circular economy. Allowing Thompson Metal Fab to continue producing steel products in the manner they do currently is a critical component in the continued development of clean energy and in effort to reduce America's carbon footprint.

As Thompson looks ahead to the future, they are currently tracking several projects and emerging markets which will certainly require a shop of their size and skill set. These projects will likely require delivery by barge and be of scale greater than or equal to what has been demonstrated. As noted, TMF has a competitive advantage with projects that require delivery by water and there is no other comparable, active facility with a roll-on/roll-off barge slip on the West Coast. Future opportunities include:

- ConocoPhillips – Willow expansion *(drill rigs, modules)*
- Oil Search – Pikka expansion *(drill rigs, modules)*

- Horseshoe Unit – Future North Slope Expansion *(drill rigs, modules)*
- Aerospace
- Offshore Wind and Wave power generators
- Burnside Bridge
- Golden Gate Bridge Seismic Retrofit
- West Coast Movable Bridges
- Hydroelectric Maintenance Projects
- Desalination in California
- Port of Nome - Expansion

Willow Expansion/Pikka Expansion/Horseshoe Unit



In many regards, the original Prudhoe Bay development has reached the end of its useful life. In 2020 original Owner, BP, sold their Prudhoe rights to ConocoPhillips and Hilcorp. Hilcorp is renowned for their ability to acquire 'legacy wells' and get a high level of production thanks to their ability to match modern technology with lean processes. What bigger companies might steer away from or flat out abandon due to high overheads, Hilcorp (a smaller independent company) can come in and still make profits for many years. The sale of Prudhoe and acquisition by Hilcorp signals the end of an era at Prudhoe, but it also marks the beginning of Alaska's next chapter in oil production.

In 2016, discovery wells were drilled in the Willow unit, owned by ConocoPhillips. The Willow unit is immediately west of Prudhoe and other large operating units but is on land that is largely under-developed. During the expansion of Prudhoe Bay facilities were tied into one another (Alpine, Kuparuk, Oooguruk, Milne Point, North Star, Endicott), man camps often shared, and roads and bridges integrated into one logistical network. Willow is far enough outside of this integrated network that relying on the existing infrastructure to support further expansion is not feasible. New piping systems would be needed, new roads would be required, new processing modules installed, and essentially a 'mini Prudhoe' would need to be built from scratch. After a successful exploration and appraisal season in 2018 it is estimated that Willow could contain up to 750-million barrels of oil and the infrastructure that would support Willow could produce approximately 100,000 barrels per day. Assuming full production each day of the year, Willow would be 'on-line' for 20-years.

This massive process module is being loaded out for delivery to the North Slope of Alaska in July 1990. This industrial equipment rivals the size of most downtown buildings and is representative of the equipment currently being requested for North Slope expansion projects. Due to scale and complex nature of work, this sort of equipment cannot be manufactured at the remote jobsite or accomplished at all in Alaska.

This massive process module is being loaded out for delivery to the North Slope of Alaska in July 1990. This industrial equipment rivals the size of most downtown buildings and is representative of the equipment currently being requested for North Slope expansion projects.

Flanked by existing units, Alpine and Kuparuk, sits Pikka. The Pikka unit is part of the Nanushuk Field which is estimated to hold as much as 1.5-billion barrels of oil. This is considered to be the biggest conventional onshore oil discovery in the US in the last 30-years. Upon full development, it is anticipated that Pikka will produce 120,000 barrels per day, and on some accounts up to 160,000 barrels per day. Conservatively, there is enough oil here to keep Pikka online for nearly 35-years.

Like Willow, there's just no infrastructure in Pikka despite being sandwiched by two existing fields. Early planning on Pikka included budgetary Requests for Proposal which were submitted by Pikka's Owner, Oil Search. One RFP requested multiple modules nearly 80' H x 200' L x 80' W, a fairly typical example of the infrastructure which is required.

Finally, early testing has been going on in the Horseshoe unit of the North Slope (south of the Willow and Pikka unit) and early indication is that Horseshoe will also be a high volume area, with volume of over 1-billion barrels. Combined with Willow and Pikka, the makings of a modern day Prudhoe Bay is in the works and could be a generational project.

Aerospace

Vandenberg Air Force Base is home to the US Air Force, United Launch Alliance, Space X, and now home of the Space Force, a branch of the US Air Force. Blue Origin is looking at Vandenberg as well and this will produce new opportunities for launch facilities. The western range is advantageous and continues to serve the needs of the industry. All these groups are getting a boost from "REACH" (Regional Economic Action Coalition). Currently, Vandenberg has the only Space Launch Complex (SLC) to launch for polar orbit. The Cape is working on a program for this, but currently the capability does not exist.

(Report from 'REACH' available for online viewing at https://reachcentralcoast.org/wp-content/uploads/Phase-0-Report.pdf)

Excerpt from the referenced report:

"Driven in large part by commercial enterprises, space is now a $425-billion industry that's expected to grow to $3-trillion over the next three decades…It's a huge opportunity and why REACH adopted building a thriving space enterprise as a core initiative in our 2030 plan."

This bold plan by the State in collaboration with all the stake holders will result in the construction of new facilities to support launch efforts at Vandenberg. Launch towers and/or mobile assemble buildings will be major projects that will require work on very large structures within this decade. The work on these facilities in the past been done by NW Oregon/SW Washington fabricators – including Thompson Metal Fab. This work requires facilities with large yard areas and heavy fabrication capabilities as well as a barge loading facility that is capable of supporting ocean going barges. There are very few of these types of facilities on the West Coast. The Columbia Business Center is one of those few spaces and represents a location that has both barge loading capabilities and the manufacturing capacity through groups like Thompson Metal Fab.

Pictures from Space Launch Complex-6 on April 26, 2021 show before and during launch of United Launch Alliance Delta IV Heavy rocket carrying a classified spy satellite. The launch table was manufactured by Thompson Metal Fab and delivered to the jobsite in 2003.

Past work in California dating back to the 1960's has been done at the Columbia Business Center. Jacket Liners for the Santa Barbara oil field were built at this location. Work for both Space Launch Complex 3 (SLC 3) and SLC 6 were done at Columbia Business Center. Much of this work required a full bridge raise to facilitate passage of the cargo on board a barge.

In addition to this planning at Vandenberg, Space X is now under contract for two more launches from there.

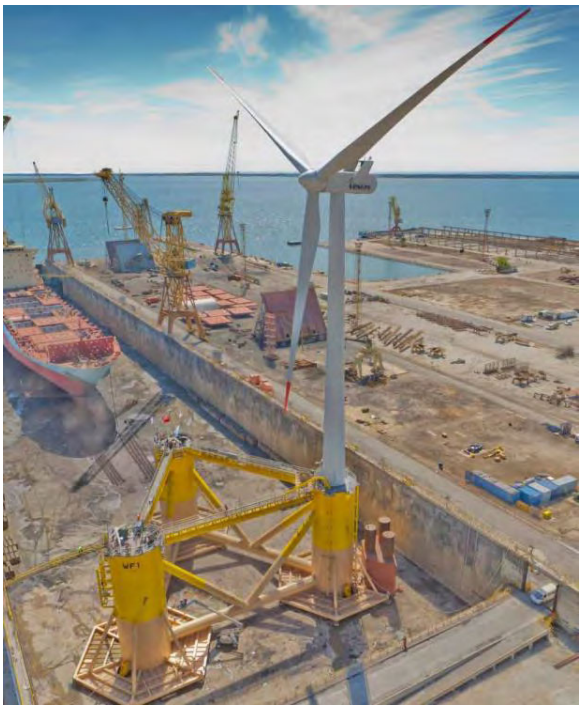
(https://www.noozhawk.com/article/defense_department_awards_contract_to_spacex_for_2_vandenberg_afb_launches)

Excerpt from NOOZHAWK Santa Barbara:

"The Department of Defense awarded Space Exploration Technologies a pair of missions that will involve two rocket launches from Vandenberg Air Force Base for the military's next-generation of space-based tools for warfighters….The announcement in the final hours of 2020 put the firm-fixed-price contract cost for SpaceX at $150,450,000…The first launch will occur in September 2022, and the second mission will take place no later than March 31, 2023, to complete putting the constellation in space, according to the award by the Space Development Agency in Washington, D.C."

SpaceX and United Launch Alliance have been awarded a 40%/60% split for launching DOD payloads. This award was made in August of 2020. For work at Vandenberg, SpaceX will have to add the capability of vertical integration of DOD payloads. This will require Space X to build a Mobile Service Tower (MST) or a similar structure to facilitate vertical integration of their vehicles. Currently SpaceX does all integration horizontally, installing satellites and rockets onto Falcon 9 and Falcon Heavy inside hangars near the company's launch pads. But some of the of the US Government's most sensitive and expensive intelligence-gathering satellites are designed to be mounted on their launch vehicles vertically. SpaceX officials have indicated that vertical integration capability is required of participants in the National Security Space Launch Phase 2 Launch Service Procurement.

Offshore Wind and Wave



Currently there are no independent organizations/companies willing to make the upfront investment into this emerging market. The land based wind industry grew because of federal tax credits that made it profitable, and without federal assistance it is unlikely that offshore systems will get the boost needed.

Recently, the administration under President Biden cited their plan to expand the use of off-shore wind farms in effort to develop renewable energy sources. The goal of the Biden Administration is to increase capacity of the current off-shore systems to power 10-Million homes by the year 2030. To meet that target, the administration intends to accelerate the permitting of projects along the coastlines and to open waters for development. $3-Billion in federal loan guarantees are available for offshore wind projects and for investing in the nation's port properties to support wind construction.

Mirroring this goal to develop offshore wind energy, the states of California and Oregon have introduced bills to develop wind energy along their coastlines. California bill AB525 sets a goal of 10GW of offshore wind by 2040,

3GW of which to be established by 2030. Oregon's HB3375 also sets a goal of 3GW by 2030. Oregon's effort is sponsored by a Republican (Rep. David Brock Smith) who has positioned the states bill as an opportunity to stimulate economic development and resiliency.

Currently there is not a facility on the West Coast that is set up to assemble these massive offshore wind systems. Thompson Metal Fab certainly has the capacity to manufacture the floating bases, and the facility/space to receive the wind towers and turbines. We also have the space to perform all assembly required. All opportunity to participate with this emerging market is gone however if the new bridge is not at a suitable height. Our current plan to participate with this emerging market is to manufacture the bases at TMF and float them downstream to a satellite yard where the towers and turbines can be assembled and installed on our bases. With that plan in place, we can utilize our current facility for all the heavy manufacturing, and provided that we are not impacted by the height of the I-5 bridge, we can ship these structures to wherever the assembly yard is located. The Biden administration keys in on one important factor, most coastal port properties are not currently set up to handle this massive manufacturing and investment in the properties must be made.

Most of the current facilities manufacturing offshore structures are on the American East Coast, or in the Gulf. Even though these facilities have the capacity, they are not well positioned to support the manufacturing of offshore systems for the West Coast. To reach the West Cost, all cargo must travel through the Panama Canal and the distance associated with voyage makes the transportation very expensive and further defines the reason why developing a manufacturer on the West Coast is so important.

Figure A-20 Vancouver

Image above comes from BOEM report in 2016 which evaluates various sites on the West Coast that would be suitable for the development of offshore wind power manufacturing. The far right shows the Columbia Business Center, and predominantly in middle is Thompson Metal Fab.

Thompson Metal Fab is one of possibly two manufacturers on the West Coast who has the size of facility, yard space and direct access to water to make our company a very attractive option for full-scale manufacturing of offshore systems. When you look at the total capacity of the Columbia Business Park, there is more than enough space and infrastructure to use our location in a dynamic way. If the new bridge does not at least accommodate this emerging market, it will be very difficult to develop the required infrastructure at all on the West Coast. Let us not lose what we currently have.

On March 3rd, 2016, the Bureau of Ocean Energy Management published a 256-page report that names the Columbia Business Park as a viable option for manufacturing offshore wind systems, but also notes that if the new height of the I-5 bridge is lowered below its current air gap it will severely restrict this type of manufacturing for any facility that is upstream of the bridge (i.e. Thompson Metal Fab).

To download a PDF file of the Environmental Studies Program report, go to the US Department of the Interior, Bureau of Ocean Energy Management, Environmental Studies Program Information System website and search for OCS Study BOEM 2016-011.

Images above comes from the 2016 BOEM report which shows the manufacturing and shipping capabilities of the Columbia Business Center for the wave power industry.

Burnside Bridge

The Burnside Bridge is scheduled for start of construction in 2024. There are two alternatives to the movable portion of the bridge: Replace the existing double-leaf bascule bridge with a vertical lift bridge – or – replace the bridge with a modern double-leaf bascule. The replacement of the approaches is difficult and would be best with a long span alternative. The option of a Tied-Arch, Cable-Stayed or Truss Span is attractive.

Image above shows the Sauvie Island Bridge being shipped to the jobsite via barge on the Willamette River and passing under the Burlington Northern RR Bridge in Portland, OR. Delivery of steel for the new Burnside Bridge would take a similar approach, due to the limited area for construction at the jobsite in downtown Portland, OR. Bridge steel coming from the Columbia Business Center would pass under the Interstate Bridge to reach the jobsite.

Due to congestion at the job site, moving the major spans into place will be done by water. Similar work has been done in the past on the Freemont Bridge, Sauvie Island Bridge and Sellwood Bridge.

Golden Gate Bridge Seismic Retrofit

The Golden Gate Bridge has an upcoming project that is one of the largest projects on a single bridge that is not new construction. The iconic towers on the Golden Gate Bridge will be retrofitted in addition to the deck steel between the two towers. This project was due to be completed by 2024 but has been delayed by other projects *(currently scheduled to be complete in 2023)*.

West Coast Movable Bridges

California has 36 movable (non-railroad) bridges. Of that group, four are in poor condition and 25 are in fair. Replacement will be recommended for some of these bridges and most will be shipped to the job-site by barge.

Oregon has the previously mentioned Burnside Bridge coming up. Additionally, the Rose Quarter Improvement project which will include the manufacturing of major steel spans.

Washington has 51 movable bridges (non-railroad). 10 are in poor condition and 34 are in fair condition. These bridges will be slow to replace due to budget issues but most of the poor condition bridges will be replace.

Hydroelectric Maintenance Projects

The current 2021 (fiscal year) budget work plan for the US Army Corps of Engineers is $2.7-Billion. Much of this work will be on the Columbia River system. Applicable work for TMF is as follows:

<u>Portland District</u>

- Bonneville Dam
  - Powerhouse 2, 65-Ton Tailrace Gantry Crane Replacement
  - Headgate Repair Pit Rehab
  - Powerhouse 1 Trash Racks
  - Fish Guidance Efficiency
- John Day Dam
  - Navigation Lock Downstream Gate Bearing Shoe Replacement
  - Trash Racks Replacement
- Cougar Dam:
  - Spillway Gate Rehab
  - Butterfly Valves

- Foster Dam:
    - Oil Spill Prevention
    - Oil Water Separator
    - Fish Weir Follow-on
- Detroit Dam:
    - Spillway Gate Rehab
- Dexter Dam:
    - Trash racks
    - Intake Gates
    - 25-Ton Intake Gantry Crane Replacement
- Green Peter Dam:
    - 180-Ton Bridge Crane Rehab
- Big Cliff Dam:
    - 40-Ton Intake Gantry Crane
    - Trash Racks and Gates Rehab

Seattle District

- Libby Dam
    - 75-Ton Intake Gantry Crane Rehab
- Albeni Falls Dam
    - Turbine Maintenance Platform
- Chief Joseph Dam
    - Intake Gates Rehab or Replacement
    - Turbine Maintenance Platform
    - 50-Ton Intake Gantry Crane Rehab
    - 18-Ton Tailrace Gantry Crane Rehab

Walla Walla District

- Ice Harbor Dam
    - Intake Gate Hydraulic System Upgrades
- Lower Monumental Dam
    - Turbine Maintenance Platform
- Lower Granite Dam
    - Turbine Maintenance Platforms

Desalination in California

California is always in a water crisis. They have new reservoirs planned that will require outlet works, gates, etc. Most of this work will ship by truck/train, but shipping over the water (by barge) will be the modular structures for new equipment in the planned Desalination facilities that California needs to sustain the population growth.

30-miles north of San Diego is the Claude "Bud" Lewis Carlsbad Desalination Plant, the largest effort in North America to turn salt water into fresh water. Each day 100-million gallons of seawater are pushed through semi permeable membranes to create 50-million gallons of fresh water that is piped to municipal users. Carlsbad, which became fully operational in 2015, creates about 10% of the fresh water the 3.1-million people in the region use, at about twice the cost of the other main source of water. This is a real issue for California and will require the state to build more of these desalination plants.

Wartime Efforts

Henry Kaiser's Vancouver Shipyard, shown in development in 1942. Eventually becoming the Columbia Business Center, this facility would become a strategic West Coast manufacturing facility.

It is important to plan for the unforeseen as well. Contingency comes in many forms; but let us not lose sight of the reason why the facility exists to begin with. Kaiser built the facility as part of the war effort in WWII. Because of the shipping clearances allowed when the drawbridge was at full height, the Vancouver Shipyards could produce Liberty and Victory war ships despite being upstream from the bridge. If that height is impacted by a fixed structure at a *lower* clearance, the ability for Thompson to support major wartime efforts is certainly diminished especially when compared to the capacity we could offer today. As noted previously, we are one of only a handful of facilities on the West Coast who has facility large enough to manufacture the structures we do and ship over the water. Reducing shipping clearances will certainly limit Thompson's ability to be a strategic West Coast manufacturer if a major wartime event occurs.

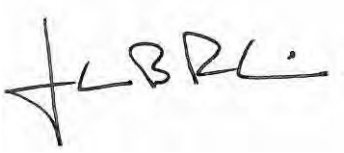
IN CLOSING

Thompson Metal Fab supports the new Interstate Bridge Replacement project. The region has outgrown the capacity of the current span and a new bridge is needed to reflect current and future needs. Innovations in transportation have changed the way people travel and move goods since 1917; and modern engineering, materials, manufacturing, and construction should allow for a beautiful, robust structure that will serve the needs for future generations. Currently the lift span on the Interstate Bridge is 178' at maximum clearance, any reduction

on a new span will have significant impact on TMF's industrial competitiveness. Less clearance will inhibit Thompson's ability to attract job-producing industrial projects to the region. Lower bridge clearance will also cause constraints for current and future energy infrastructure needs where TMF is counted on to be a major supplier to energy producers. Impacts to clearance could also affect the development of renewable energy sources, such as offshore wind. A facility, like that at Thompson Metal Fab in the current configuration, will be critical in the success of offshore wind programs on the West Coast. Additionally, users such as the US Army Corps of Engineers, will be impacted as they depend on TMF to deliver structures by barge to support our region's dams and ports East of I-5.

We recognize a new Interstate Bridge replacement needs to meet the requirements of all modern and future modes of transportation, and that requirement will most likely impact our historical, current, and future usage of river transit. However, Thompson also recognizes the importance of a new, safe, and modern bridge to the region, and is willing to work with the Interstate Bridge Replacement project team to preserve Thompson Metal Fab and hundreds of family wage jobs, while at the same time advancing a much needed new bridge to the future.

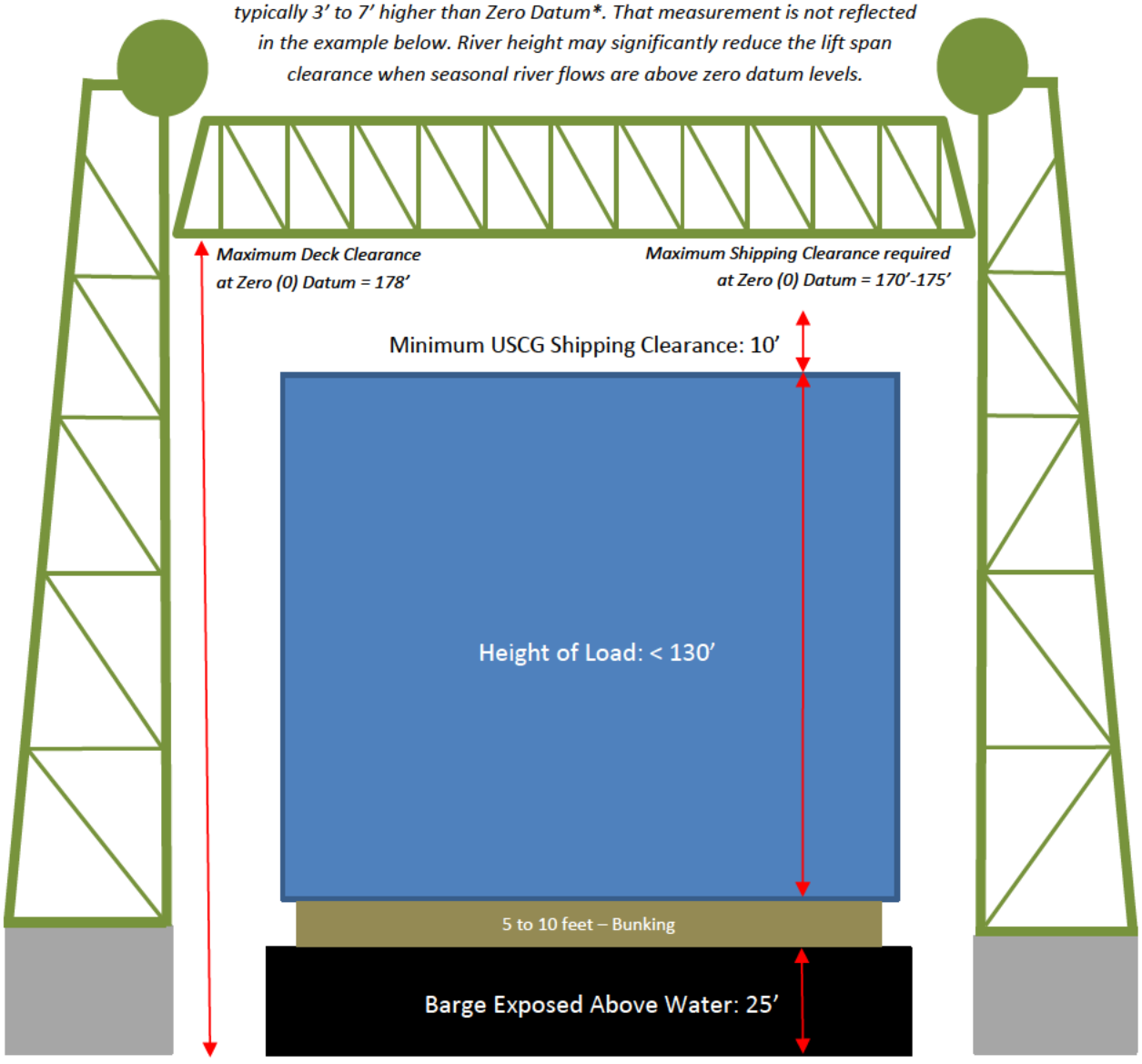
Sincerely,



John B. Rudi
Owner/President
Thompson Metal Fab

Thompson Metal Fab	Revision 0
Interstate Bridge Replacement Project	May 26, 2021
Appendix A – Bridge Clearance Visual Aid	PG 1 of 1

Clearance information assumes Zero (0) Datum. The Columbia River is typically 3' to 7' higher than Zero Datum. That measurement is not reflected in the example below. River height may significantly reduce the lift span clearance when seasonal river flows are above zero datum levels.*

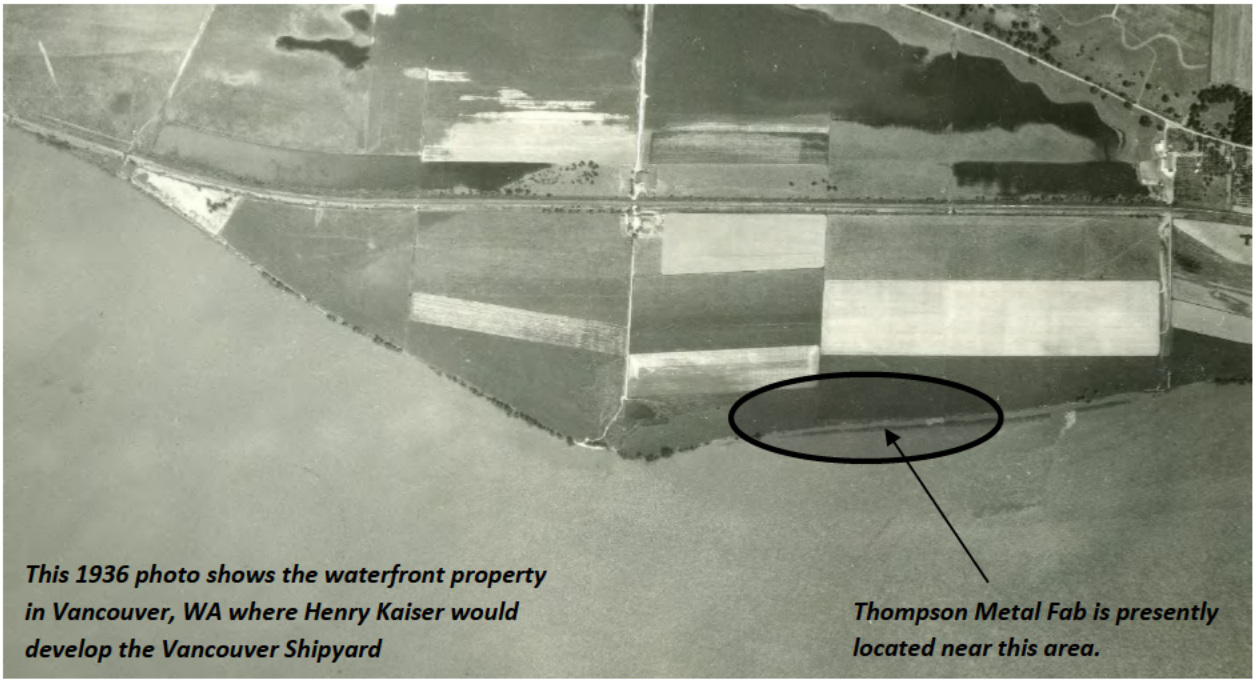


* https://water.weather.gov/ahps2/hydrograph.php?wfo=pqr&gage=vapw1

EXAMPLES OF THOMPSON METAL FAB PROJECTS WHICH REQUIRED BRIDGE LIFT

Owner	Project Name	Shipping Date	Shipping Destination	Number of Barges	Barge List, FT *(height exposed above waterline)*	Dunnage/Blocking Height (ft)	Height of tallest structure (ft)	USGC Minimum Gap (ft)	Total Required Clearance, FT *(Assumes Zero Datum)*
AKDOT	Ward Cove Ferry Dock Expansion	2020	Ketchikan, AK	1	25	5	14	10	54
Intel	LARK E-Houses	2020	Hillsboro, OR	1	25	5	16	10	56
ASE	Wind Tunnel Retrofit	2019	Tongue Point, OR	1	25	5	18	10	58
Hilcorp	Innovation Rig	July 2016	North Slope, AK	1	25	10	50	10	95
Multnomah County	Sellwood Bridge	2015-2016	Portland, OR	7	25	5	20	10	60
Furie	Monopod Pile	July 2014	Cook Inlet, AK	1	25	0	126	10	161
Saxon Drilling	Rig 147	July 2013	Kenai, AK	1	25	10	40	10	85
Saxon Drilling	Rig 169	July 2013	Kenai, AK	1	25	10	40	10	85
Parker Drilling	Rig 272	July 2011	North Slople, Alaska	1	25	10	113	10	158
Parker Drilling	Rig 273	July 2011	North Slople, Alaska	1	25	10	113	10	158
Doyon Drilling	Rig 25	July 2010	North Slople, Alaska	2	25	10	70	10	115
British Petroleum (BP)	Liberty Rig	July 2009	North Slople, Alaska	2	25	10	100	10	145
CalTrans	East Tie-In	2008-09	Bay Area, CA	2	25	5	40	10	80
OHSU	Portland Aerial Tram	2006	Portland, OR	1	25	10	33	10	78
CalTrans	Bay Bridge Retrofit	2006	Portland, OR	3	25	5	60	10	100
US Army Corps of Engineers	Ice Harbor RSW	March 2005	Portland, OR (Swan Island) and then to Ice Harbor Dam	1	25	5	68	10	108
Samuel Engineering	Alaska Gold Mining	2005	Nome, AK	1	25	5	50	10	90
CalTrans	Richmond San Rafael Retrofit	2004	Bay Area, CA	1	25	5	40	10	80
Boeing	Delta IV Launch Table	2003	Vandenberg AFB, CA	1	25	10	33	10	78
US Army Corps of Engineers	Lower Granite RSW	March 2001	Portland, OR (Swan Island) and then to Lower Granite Dam	1	25	5	61	10	101
Pool Arctic	Rig 9	1999	North Slope Alaska	1	25	10	60	10	105
Cascade General	Esperanza Power Barge	1999	Portland, OR	1	25	10	30	10	75
Pool Arctic	Rig 6	1998	North Slope, AK	1	25	10	60	10	105
PGE	Trojan Decommissioning	1998	Hanford, WA	1	25	5	40	10	80
Nordic-Calista	Rig 3	July 1997	North Slople, Alaska	1	25	10	78	10	123
LaFarge Cement	Pre-Heater Tower	1997	Richmond, BC, Canada	1	25	5	60	10	100
Cascade General	Golmar Explorer Ship Conversion	1997	Portland, OR	1	25	5	30	10	70
TriMet	Terry Moore Pedestrain Bridge	1996	Portland, OR	1	25	5	30	10	70
WSDOT	Duwamish Bascule Bridge	1996	Seattle, WA	1	25	5	30	10	70
CalTrans	Nimitz Freeway	1995	Bay Area, CA	4	25	5	70	10	110
Port of Sacramento	Bulk Material Handling System	1993	Sacramento, CA	1	25	5	50	10	90
Powell River Paper Company	Chlorine Dioxide Module	November 1991	British Columbia, Canada	1	25	5	76	10	116
Parker Drilling	Rig 245	July 1990	North Slople, Alaska	1	25	10	78	10	123
Pacific Marine	SWATH Hull	1989	Honolulu, HI	1	25	10	60	10	105
Christenesn Marine	Dry Dock	1987	Vancouver, WA	1	25	10	40	10	85
ConocoPhillips	Milne Point Modules	1987	North Slope, AK	3	25	10	30	10	75
	Newport Bay Floating Foundation	1986	Portland, OR	1	25	5	20	10	60
WSDOT	I-90 East Channel Bridge	1986	Seattle, WA	1	25	5	30	10	70
ARCO	Housing Expansion	July 1985	North Slople, Alaska	1	25	5	65	10	105
Georgia Pacific	Wood Chip Material Handling System	1973	Toledo, OR	1	25	5	60	10	100

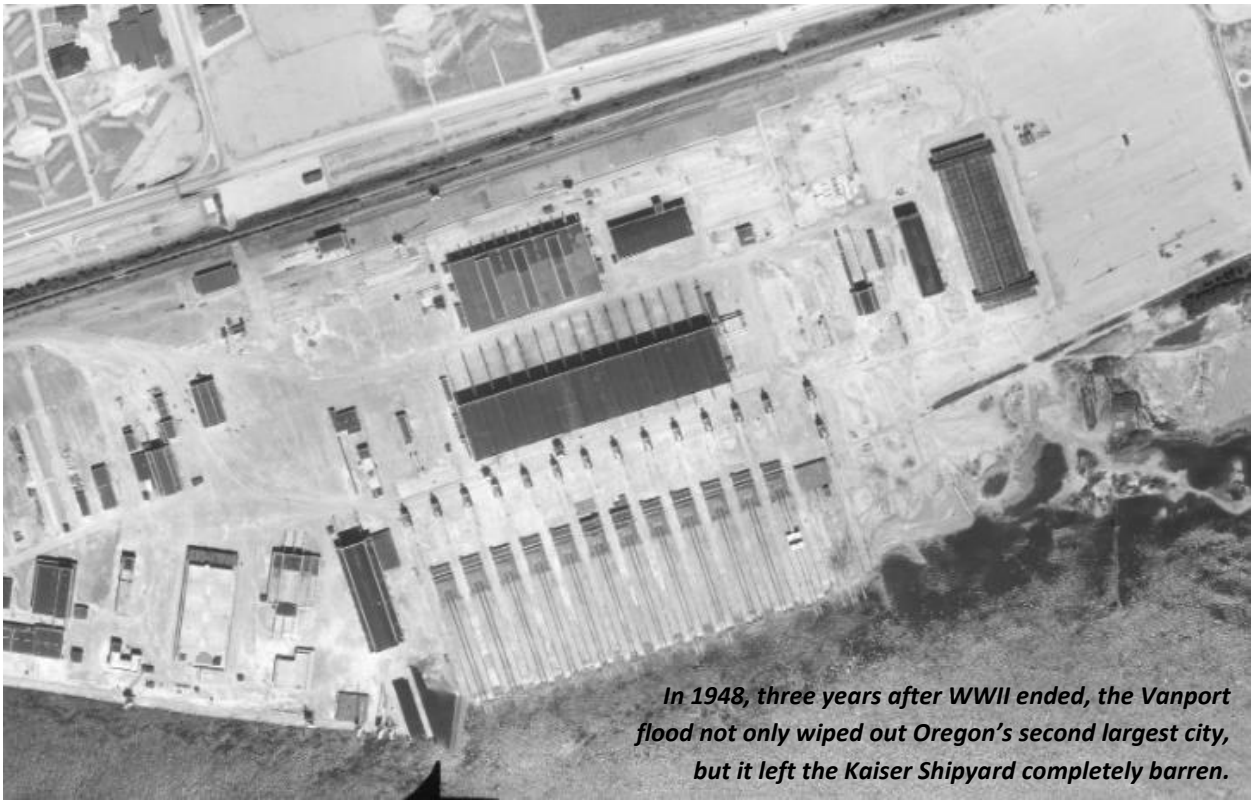
Bridge to be opened at Captain's discretion for loads under 72' high.



This 1936 photo shows the waterfront property in Vancouver, WA where Henry Kaiser would develop the Vancouver Shipyard

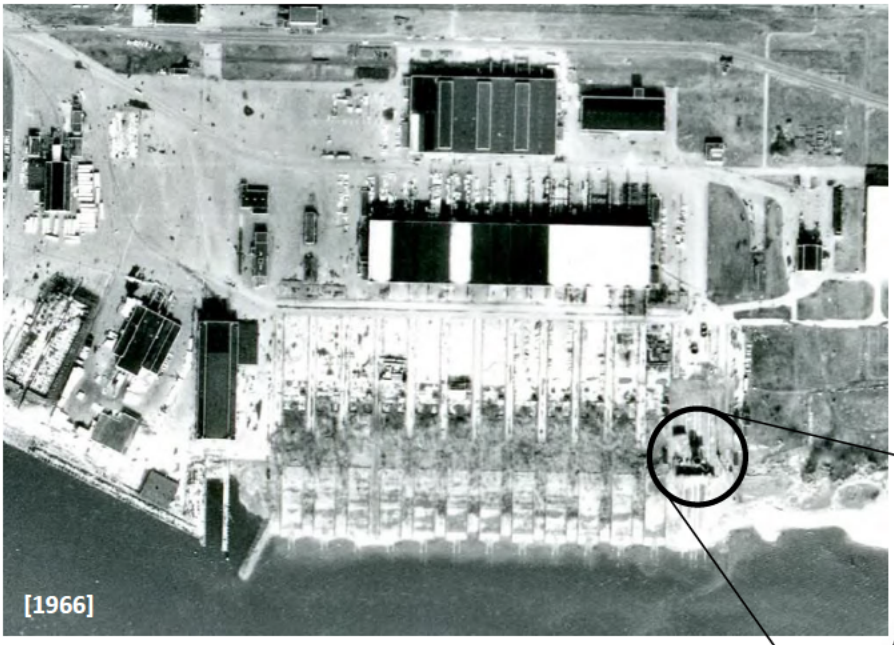
Thompson Metal Fab is presently located near this area.

In just a few years nearly 200-acres was redeveloped, providing Vancouver a major industrial waterfront facility. An active Kaiser Shipyard is shown here in 1943



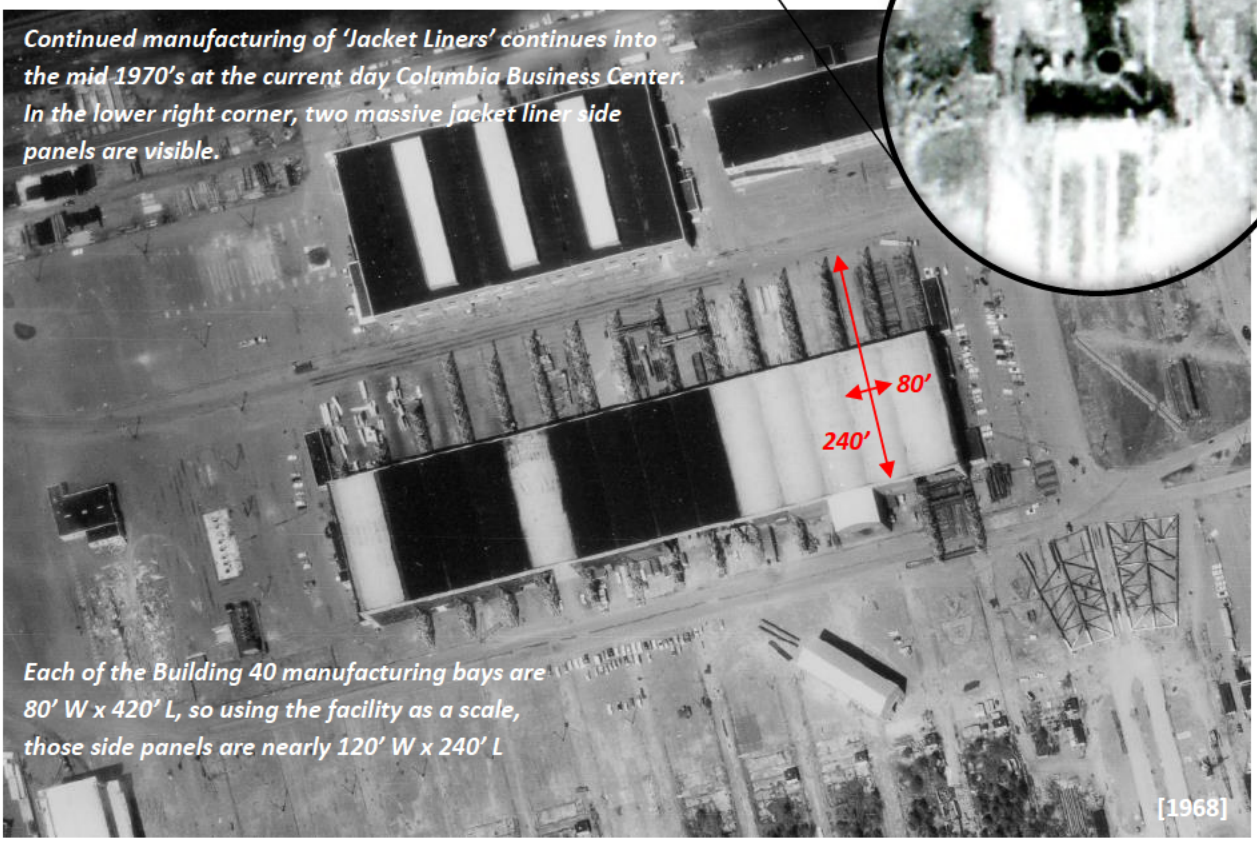
In 1948, three years after WWII ended, the Vanport flood not only wiped out Oregon's second largest city, but it left the Kaiser Shipyard completely barren.

By 1956, the facilities at the current Columbia Business Center are in full operation once more, leveraging the capacity to support the industrial needs of the time.



[1966]

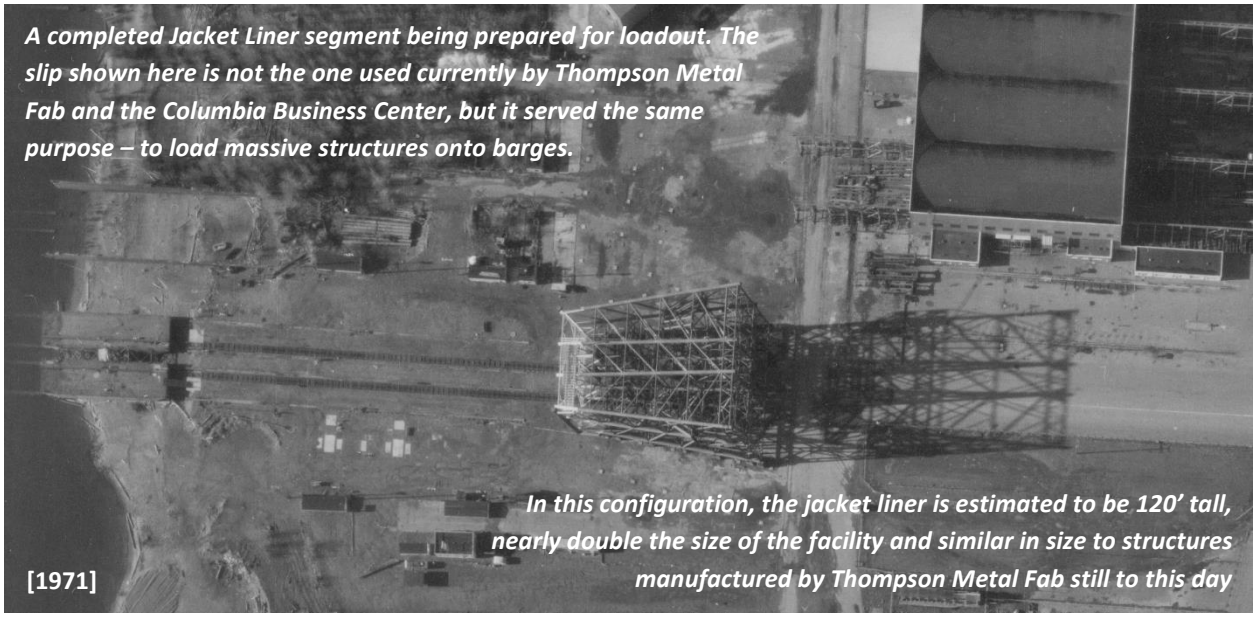
The development of offshore oil in California required the fabrication of massive infrastructure. Typically, offshore oil fabrication is done in the Gulf states, but with major oil production now on the West Coast those Gulf state areas could not lend support and a West Coast facility was required.



Continued manufacturing of 'Jacket Liners' continues into the mid 1970's at the current day Columbia Business Center. In the lower right corner, two massive jacket liner side panels are visible.

Each of the Building 40 manufacturing bays are 80' W x 420' L, so using the facility as a scale, those side panels are nearly 120' W x 240' L

[1968]



A completed Jacket Liner segment being prepared for loadout. The slip shown here is not the one used currently by Thompson Metal Fab and the Columbia Business Center, but it served the same purpose – to load massive structures onto barges.

In this configuration, the jacket liner is estimated to be 120' tall, nearly double the size of the facility and similar in size to structures manufactured by Thompson Metal Fab still to this day

[1971]

Roofing being extended to Building 40, Bay 10-12 (current Thompson Metal Fab).

TMF Project Managers, early 1970's

Shortly after moving to Vancouver, TMF would enclose bay 5-9 with a roof and walls. A sign marked the location.

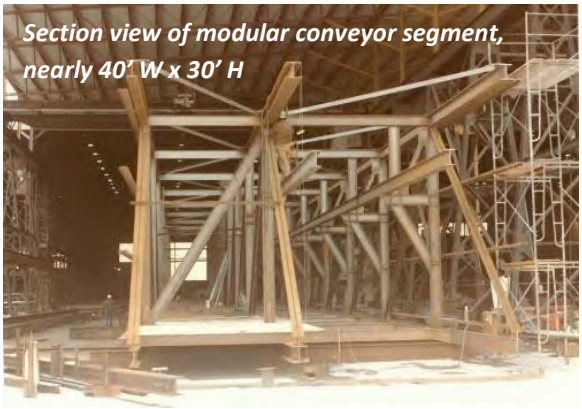
At 300' long, this conveyor nearly takes up the entire length of a bay at TMF

A barge is being loaded with conveyors for delivery to Bay Area, CA

Completed conveyor tubes, staged for barge loading in Thompson's yard.

Conveyor systems and support towers were a major part of Thompson's first few decades at the Columbia Business Center. TMF's barge slip allowed for massive, modular deliveries to Ports, pulp & paper factories, and other industrial areas.

Completed conveyor project at the Port of Longview. Thompson fabricated the conveyors and support towers.



Section view of modular conveyor segment, nearly 40' W x 30' H

Conveyor being loaded on barge at Thompson Metal Fab.

There are numerous Ports on the Columbia River with large, developed properties and robust industrial activity. These Ports are critical to our region and are the hub for most incoming goods.

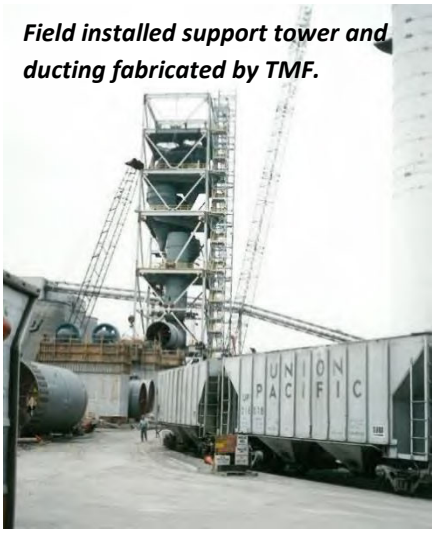
Conveyor systems are often used at Ports to quickly handle and transfer bulk materials. Thompson Metal Fab manufactured and delivered the massive conveyor system and support towers shown here and delivered to the Port of Longview.

Modular structures were loaded on a barge and erected in the field. Delivering modular units allows for quicker assembly in the field and easier integration of all mechanical components.

Conveyors come in many shapes and sizes, depending on the intended use. Shipping the structures pre-assembled saves on time and money in the long-run and is a value-add for Owners and other stakeholders. Shown here are additional examples of projects that were manufactured by Thompson and delivered all over the West Coast, from Toledo, OR to Sacramento, CA.

Heavy ducting for baghouses requires a facility like Thompson's. They can accommodate the size of the infrastructure in their shop and ship over the water by barge. The large duct section shown here is nearly 30' high and over 100' long.

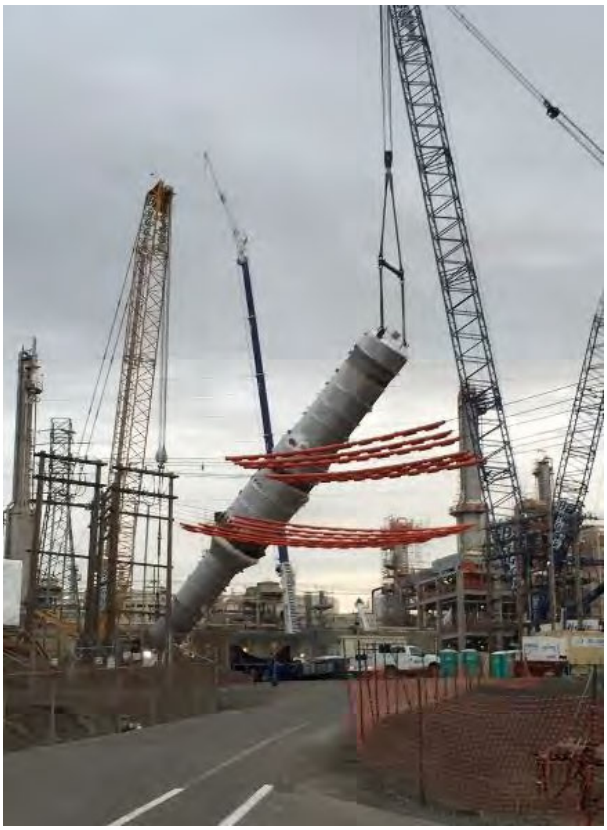
Structural tower inside Thompson's shop being outfitted with piping and ducting systems. This tower is well over 30' high.



Field installed support tower and ducting fabricated by TMF.

Baghouse components being loaded on a barge from Thompson Metal Fab's facility

Nearly touching the rafters, this giant structural building will soon be outfitted with mechanical items prior to load out on the barge. The size of Thompson's facility provides value to project owners who seek out modular, turn-key solutions for their infrastructure needs.



Refineries on the West Coast are typically located on coastal properties or are otherwise accessible by deep water ports. In addition to capacity expansion and improvements, these facilities have processing vessels and other equipment that wear out over time and need to be replaced.

Shown here at the Phillips 66 facility in Rodeo, CA, Thompson Metal Fab fabricated a "prefractioner" tower which was 17' diameter x 126' L. Too large and heavy to ship over the road, this vessel was delivered by barge and direct to the jobsite.

By land, sea, and air! Completed tanks for Solvay Chemical (Longview, WA) were transported by barge from Thompson's facility. Tanks were then removed from the barge by helicopter and set in place at the jobsite.

Process vessels and skids are being loaded on a barge from Thompson Metal Fab's facility. This load will be delivered to Alaska and used on the North Slope. These units are well over 20' and 40' long.

Large tanks for Amalgamated Sugar in Portland, OR. The tanks are used as part of their manufacturing process. Due to the size of the tanks, they were shipped by barge and then transloaded to a truck for final delivery.

Trunnions for the Interstate Bridge shown above in Thompson's shop. Their proximity to the bridge made TMF an ideal location when repairs were needed. Shown below are two Seattle area bridge projects that were completed at the Columbia Business Center, painted by TMF, and delivered to the jobsite by barge.

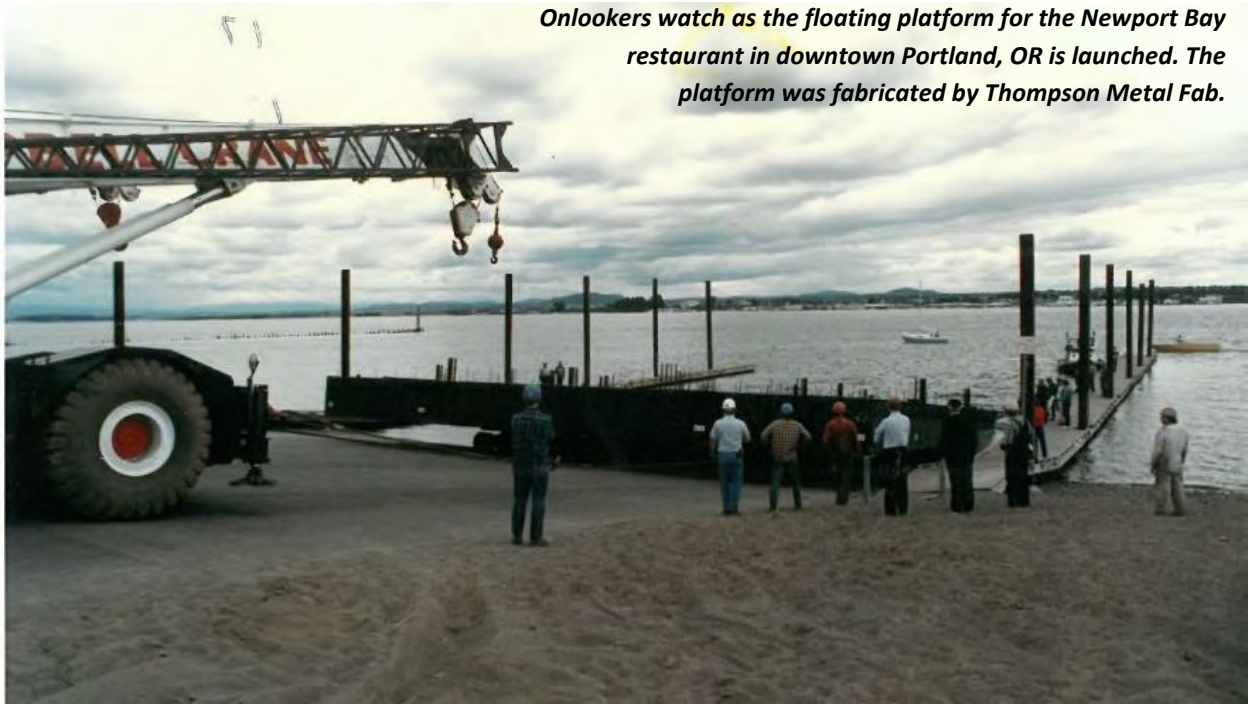
These structures are 9' diameter x 132' long and part of a Small Waterplane Area Twin Hull (SWATH). Once assembled in Thompson's yard, the hull measured 53' wide and nearly 60' high once outfitted with the superstructure. Thompson's location adjacent to the Columbia River was a key part in earning this business. After testing in the river, the "Navatek" shipped to Hawaii where the vessel still operates.

Barge load approaching the Interstate Bridge after leaving Thompson Metal Fab. TMF's massive facility is seen in the background.

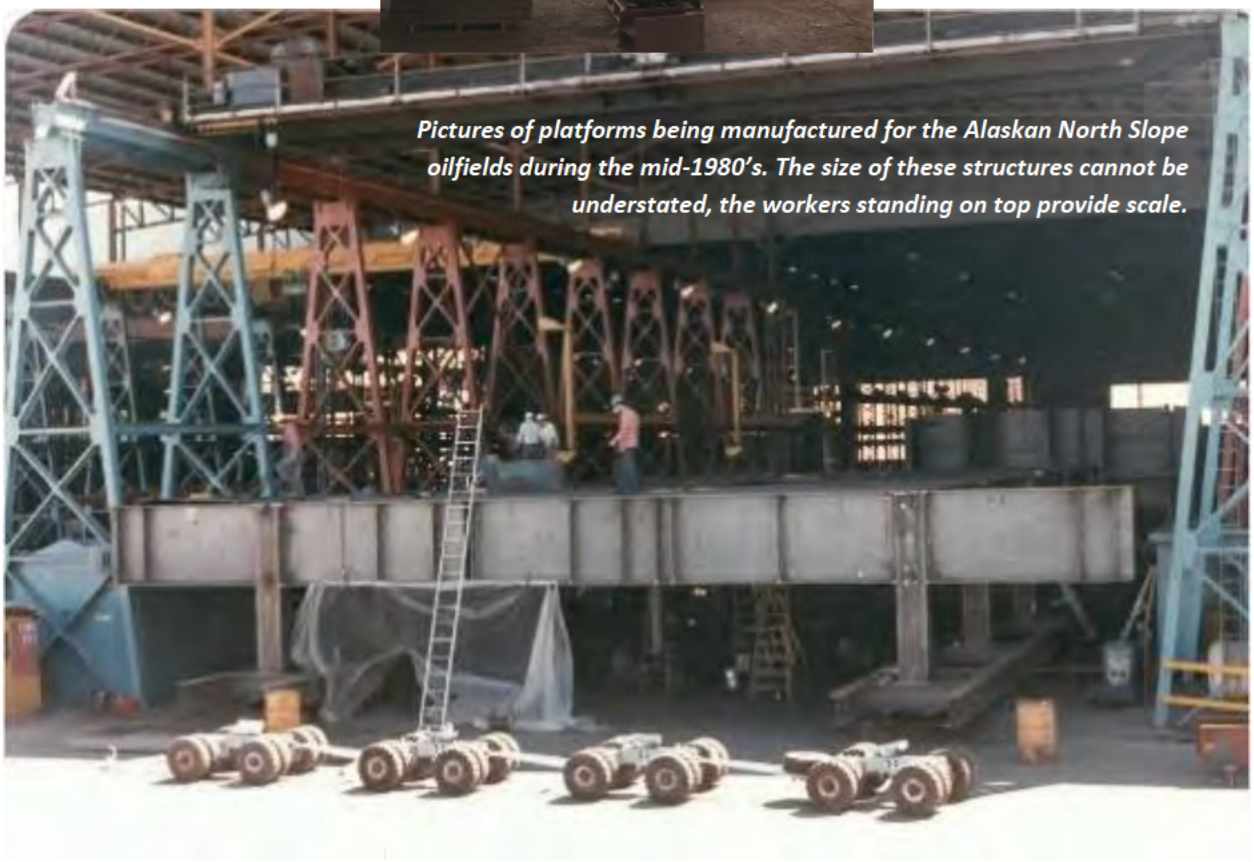
Shown above and below is a modular segment of the Power Barge fabricated by TMF. Segments were pre-fabricated in the shop before being assembled in Thompson's yard. The final assembly was 105' W x 30' H x 284' L

At left, large platform is being flipped inside Thompson Metal Fab's shop.

Thompson Metal Fab has a legacy of fabricating unique, complex, and often massive structures which require delivery by water.



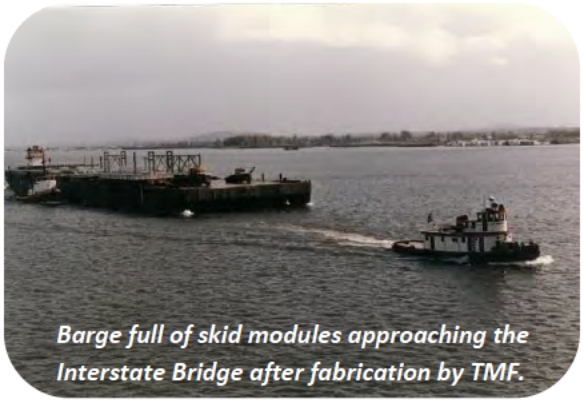
Onlookers watch as the floating platform for the Newport Bay restaurant in downtown Portland, OR is launched. The platform was fabricated by Thompson Metal Fab.



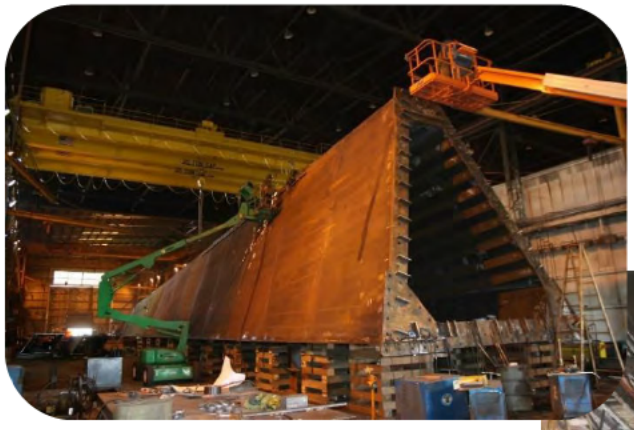
Pictures of platforms being manufactured for the Alaskan North Slope oilfields during the mid-1980's. The size of these structures cannot be understated, the workers standing on top provide scale.

Shown below, load out of the cradle base that would carry PGE's Trojan nuclear reactor. TMF fabricated the base and the shielding enclosures.

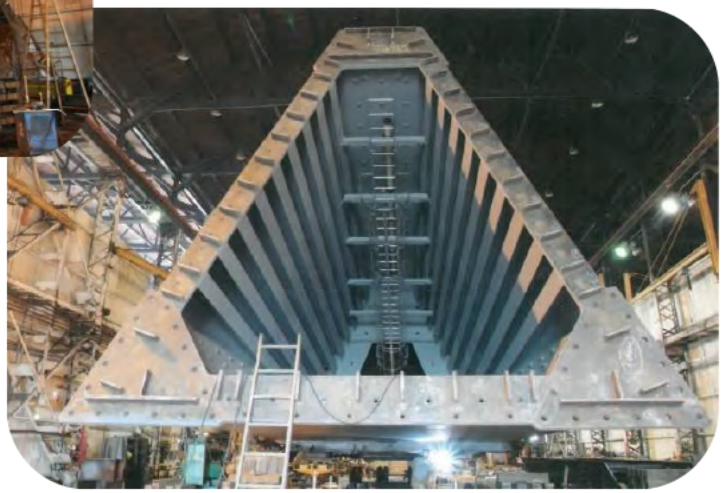
Support towers nearing the Interstate Bridge. This load is headed for the Port of Sacramento upon completion at Thompson Metal Fab

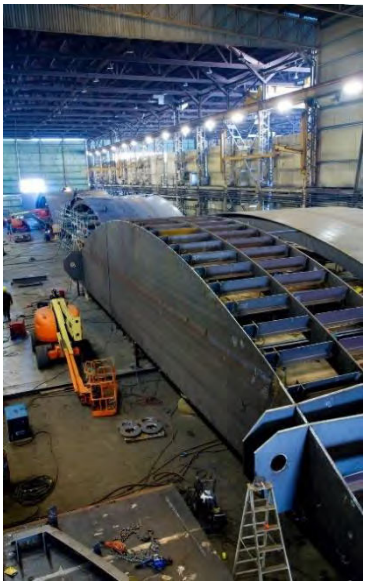


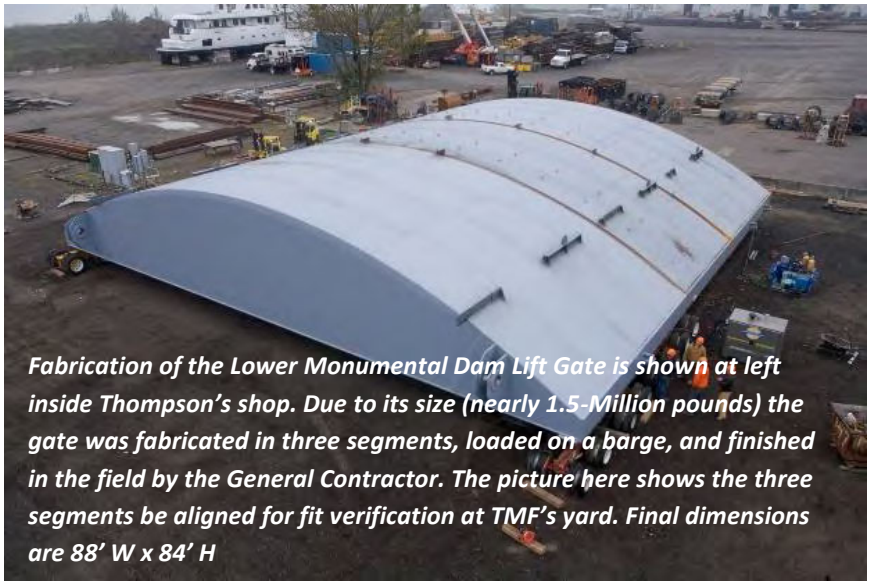
Barge full of skid modules approaching the Interstate Bridge after fabrication by TMF.



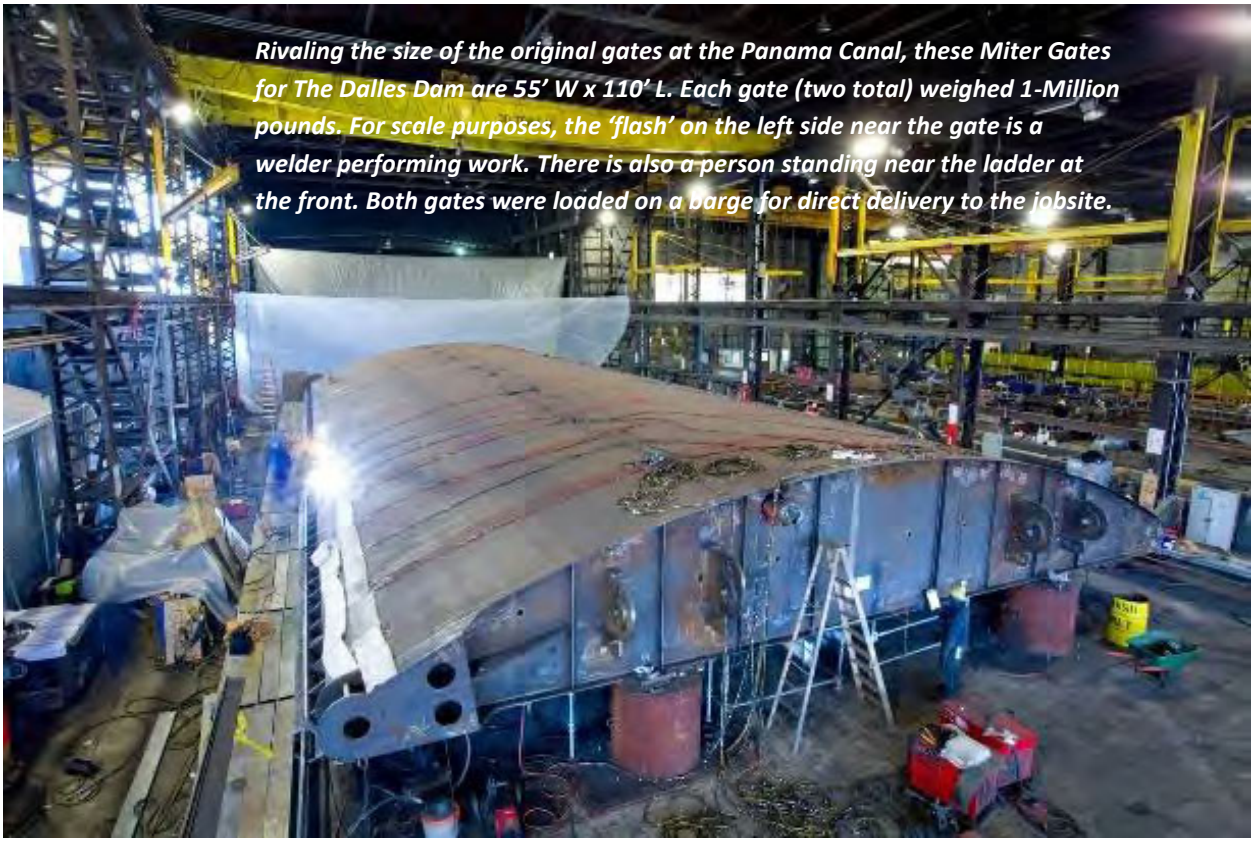
The lower segment of the iconic Portland Aerial Tram's tower is shown inside Thompson Metal Fab's shop. Including the bunking underneath, the tower is nearly 40' high and 30' wide. The completed tower can be seen at OHSU, spanning over I-405.







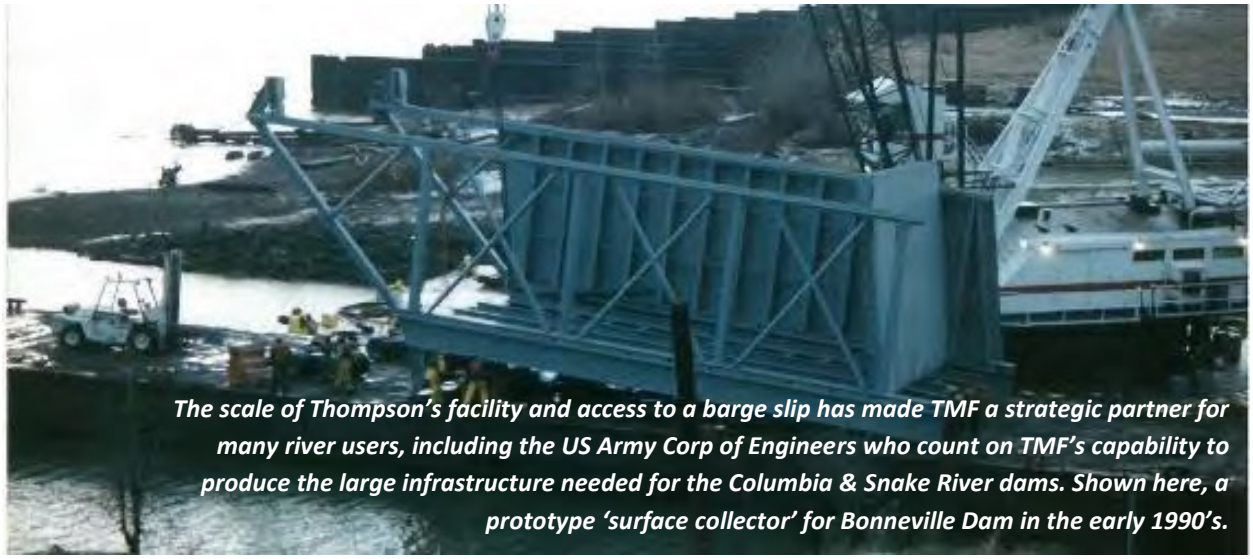
Fabrication of the Lower Monumental Dam Lift Gate is shown at left inside Thompson's shop. Due to its size (nearly 1.5-Million pounds) the gate was fabricated in three segments, loaded on a barge, and finished in the field by the General Contractor. The picture here shows the three segments be aligned for fit verification at TMF's yard. Final dimensions are 88' W x 84' H



Rivaling the size of the original gates at the Panama Canal, these Miter Gates for The Dalles Dam are 55' W x 110' L. Each gate (two total) weighed 1-Million pounds. For scale purposes, the 'flash' on the left side near the gate is a welder performing work. There is also a person standing near the ladder at the front. Both gates were loaded on a barge for direct delivery to the jobsite.

Many of the structures fabricated by TMF require the use of specialty moving systems for handling around the shop and for loading barges. Shown here, an SPMT (Self Propelled Modular Transporter) is used to move one of the Ward Cove Rection Dolphins from TMF's Bay 8 and out to the barge slip for loading. Each reaction dolphin is 30' x 30' x 12' H

Barge load out for the Ward Cove Ferry Terminal Expansion project. All structures were fabricated at the Columbia Business Center, including the Transfer Span and Reaction Dolphins which were completed by Thompson. The Transfer Span, shown near the back of the barge is 14' H x 140' L. These structures were delivered direct to the jobsite in Ketchikan, AK.



The scale of Thompson's facility and access to a barge slip has made TMF a strategic partner for many river users, including the US Army Corp of Engineers who count on TMF's capability to produce the large infrastructure needed for the Columbia & Snake River dams. Shown here, a prototype 'surface collector' for Bonneville Dam in the early 1990's.

Shown above and below are multiple barge loadings for a massive project at Lower Granite Dam in the mid-1990's. All structures were fabricated by Thompson Metal Fab and loaded out at the Columbia Business Center.

Load out of housing modules manufactured by Thompson Metal Fab. This housing will be used for the workers on Alaska's North Slope.

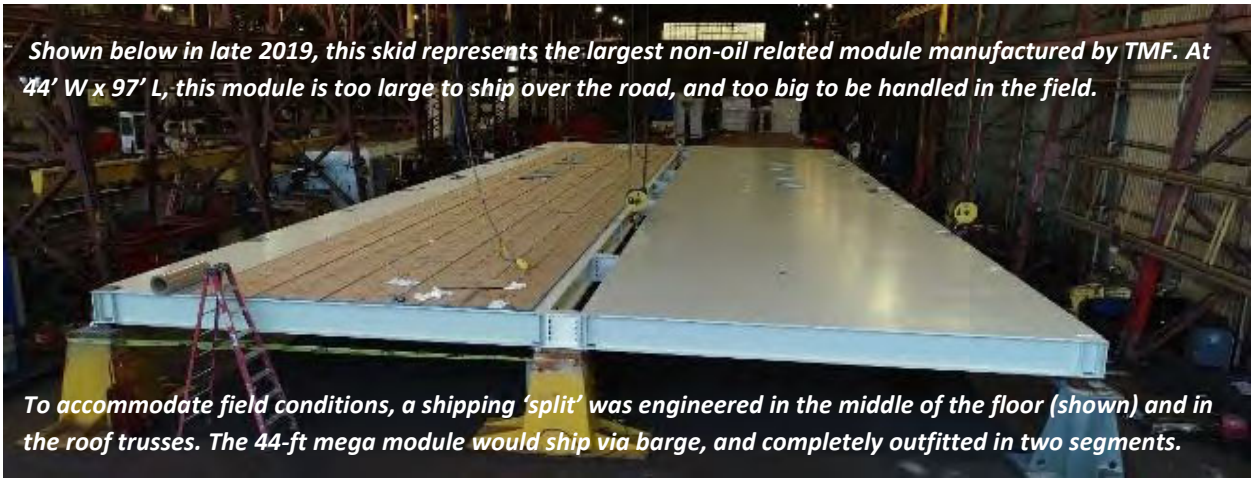
Enclosed modules to be used for a drilling rig, shown inside TMF's shop

Modular fabrication has long been a part of Thompson's history and success. The size of their facility at the Columbia Business Center allows TMF to offer large, turn-key, fully-operational modular systems which get used for housing, data centers, oil production/drilling, crude oil processing, technology, electrification, water treatment, chemical processing, fuel storage, pipe handling, and conveyor systems – among other uses. Remote jobsite locations and size of many of these structure require use of the barge slip, adjacent to Thompson's facility.

Example of processing modules being manufactured inside Thompson Metal Fab

Walls, roof, and equipment being installed on 44' x 97' skid shown below

Thompson's extensive experience with turn-key modular systems made it a valuable partner as a new market emerged for these products. Increase demand for technology pushed groups, like Intel, to expand their facilities. 'Cloud based' data storage requires facilities on the ground that can house servers. Increased online shopping (i.e. Amazon) requires warehouses and data centers. As the world becomes dependent on technology the demand for these custom, modular buildings has significantly increased.



Shown below in late 2019, this skid represents the largest non-oil related module manufactured by TMF. At 44' W x 97' L, this module is too large to ship over the road, and too big to be handled in the field.

To accommodate field conditions, a shipping 'split' was engineered in the middle of the floor (shown) and in the roof trusses. The 44-ft mega module would ship via barge, and completely outfitted in two segments.

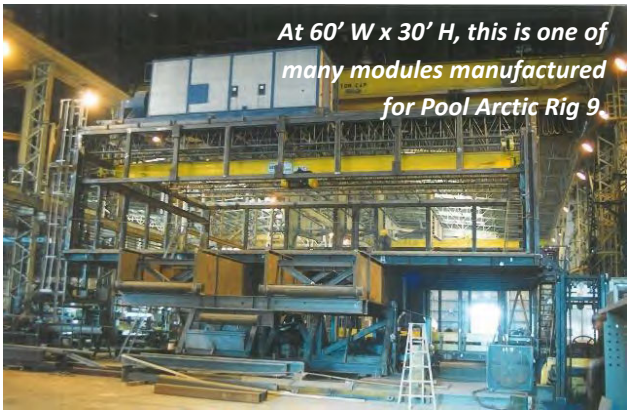
Two 44' x 97' modules were manufactured by TMF, each with a shipping split described above. Shown in the middle of this picture are two of the four total segments prior to barge loading.

Also shown is the BNSF Wind River Bridge. This was manufactured at the Columbia Business Center and would ship via barge completely assembled and installed in one-piece.

Pool Arctic Rig 3 Retrofit, performed by TMF

In the late 1990's, Thompson Metal Fab would retrofit Pool Arctic's Rig 6 with a new, modern moving system. A TMF foreman provides scale to the size of the wheels used on the rig.

Manufacturing Pool Arctic's Rig 9 inside TMF.

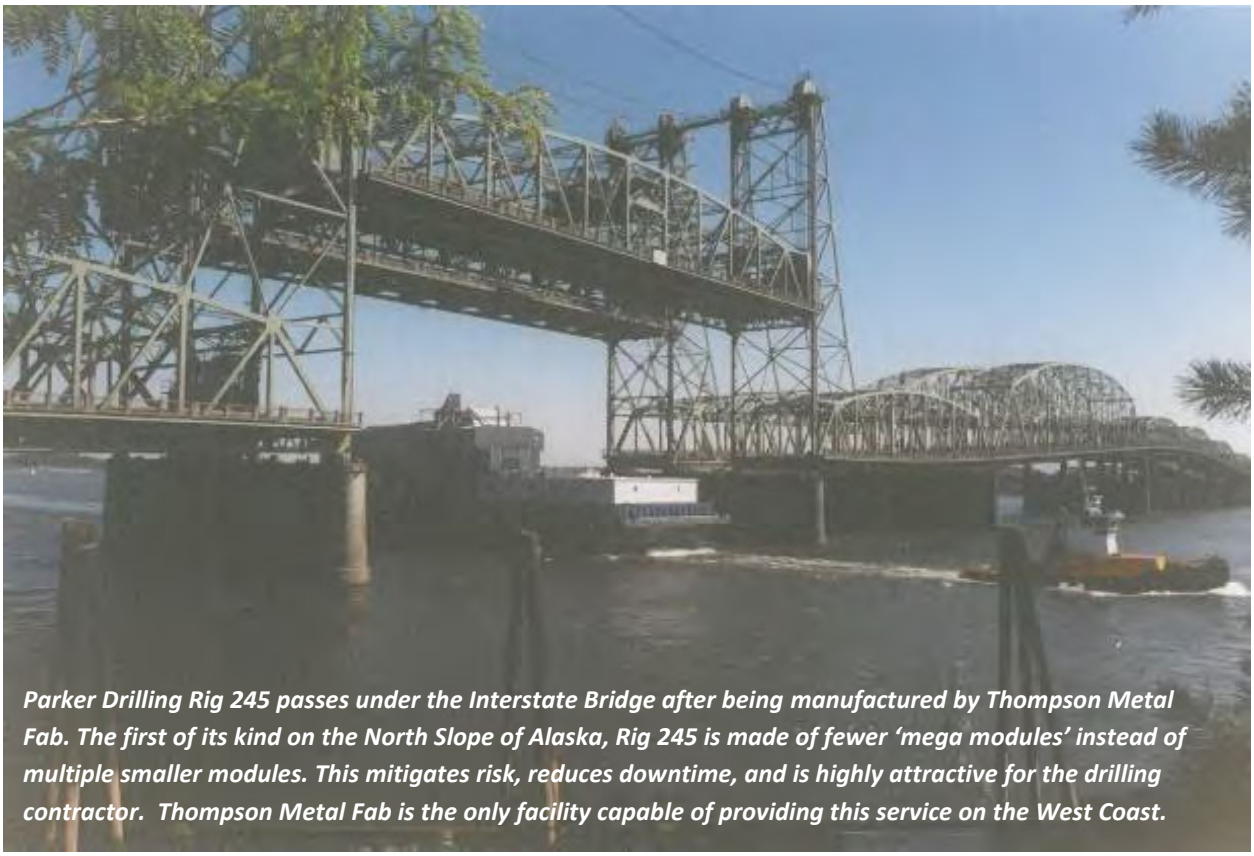


At 60' W x 30' H, this is one of many modules manufactured for Pool Arctic Rig 9.

Following some of its recent predecessors (i.e. Rig 245), Rig 9 would use the 'mega module' concept to reduce downtime on the North Slope

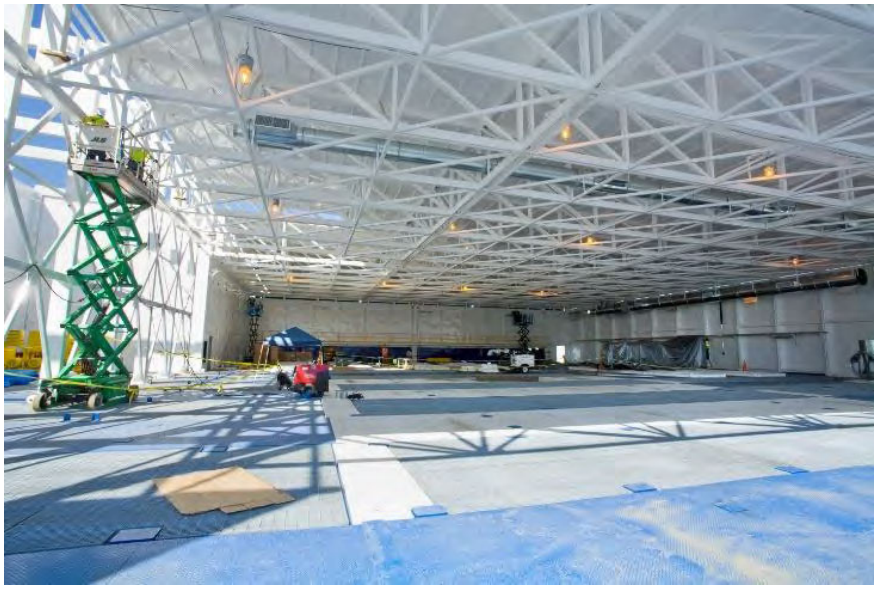
Over the last 30-years, 15 rig projects have been awarded to Thompson Metal Fab. Nearly 1/3rd of the rigs in Alaska have some connection to TMF.

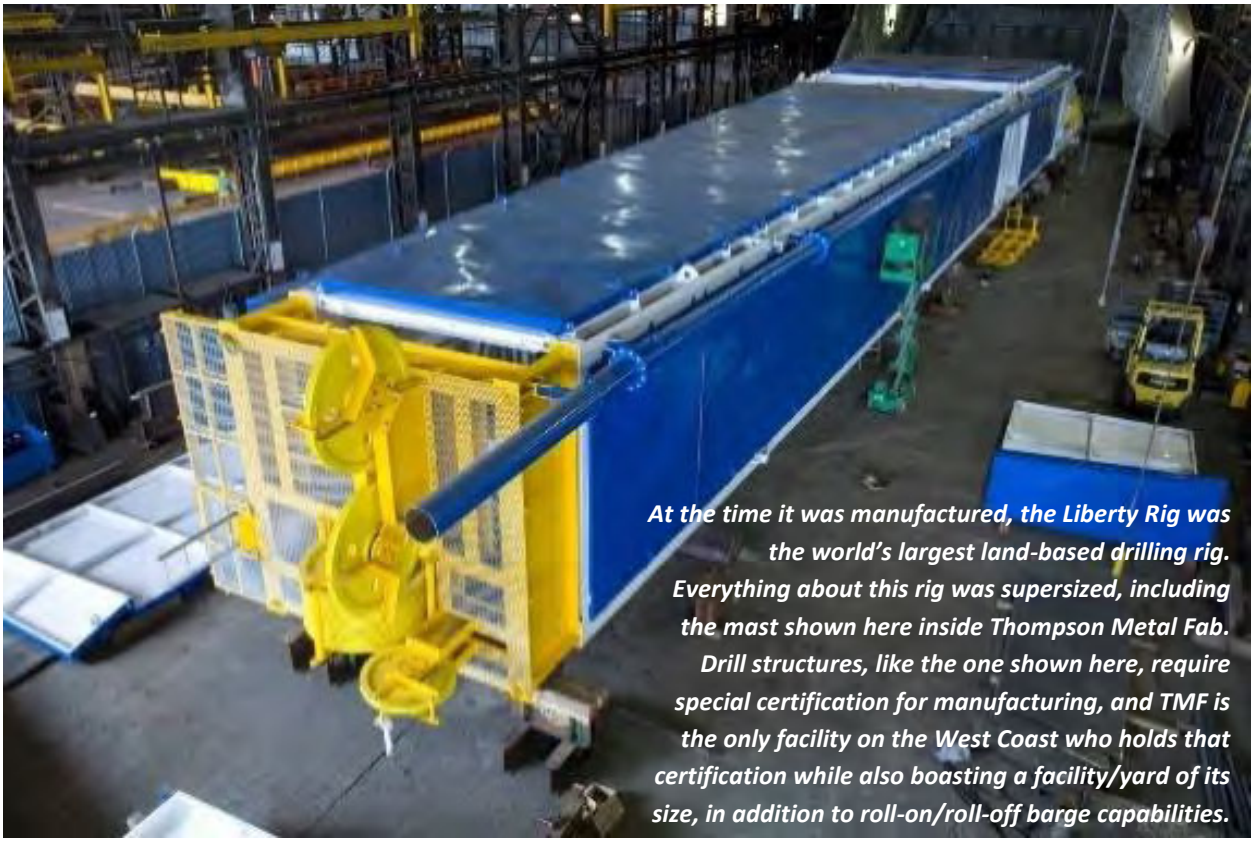
Shown at right, Nordic-Calista's Rig 3 being 'rigged up' in Thompson's yard in 1997. This workover rig is used to restore production on exiting wells.



Parker Drilling Rig 245 passes under the Interstate Bridge after being manufactured by Thompson Metal Fab. The first of its kind on the North Slope of Alaska, Rig 245 is made of fewer 'mega modules' instead of multiple smaller modules. This mitigates risk, reduces downtime, and is highly attractive for the drilling contractor. Thompson Metal Fab is the only facility capable of providing this service on the West Coast.

No, the picture to the right is not the inside of a 'big box' store, but it is the size of one! This is the inside of the Liberty Rig's Pipe Module (see above) and is where all production drill pipe is stored.



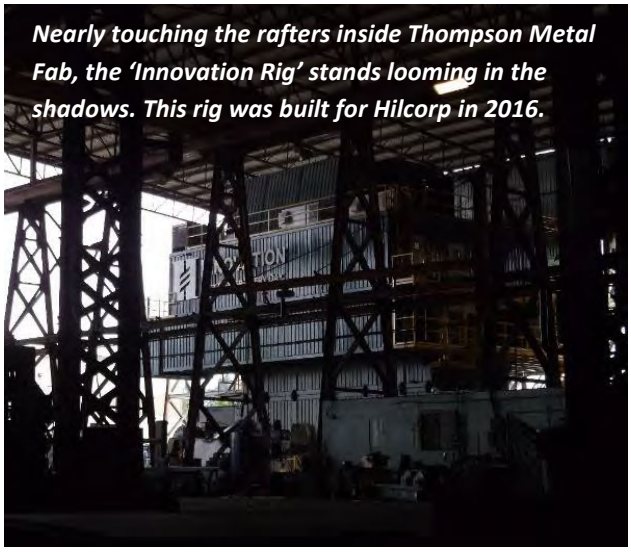


At the time it was manufactured, the Liberty Rig was the world's largest land-based drilling rig. Everything about this rig was supersized, including the mast shown here inside Thompson Metal Fab. Drill structures, like the one shown here, require special certification for manufacturing, and TMF is the only facility on the West Coast who holds that certification while also boasting a facility/yard of its size, in addition to roll-on/roll-off barge capabilities.

For new rig builds, drilling contractors traditionally manage the design and hire their own sub-contractors (structural, electrical, mechanical, etc.) For Doyon Drilling's Rig 25, TMF was hired as the General Contractor and managed all rig-build efforts on behalf of Doyon. As a result, Rig 25 becomes the rig built by Thompson as General Contractor.

Rig 25 is a sought after work-horse on Alaska's North Slope and is a dependable rig in Doyon's fleet. This picture shows a very proud Thompson team at the end of the project.

Shown above is the part of the substructure base for Rig 272. Its twin (Rig 273) was manufactured at the same time at TMF. Picture below shows the yard assembly of Rig 272, Rig 273, and Rig 25.



Nearly touching the rafters inside Thompson Metal Fab, the 'Innovation Rig' stands looming in the shadows. This rig was built for Hilcorp in 2016.

The Interstate Bridge looks on in the distance as Thompson Metal Fab manufactures three rig projects from their Columbia Business Center facility. Shipping clearance on Rig 272 & 273 (blue) would be nearly 160'.