

REPORT ON ADMINISTRATIVE SABBATICAL LEAVE 1970

STUDY AND COMPARISON OF CONSTRUCTION METHODS AND TECHNIQUES

IN SOUTHERN CALIFORNIA

THE MIDWEST

THE EASTERN SEABOARD

CANADA

by

Charles S. Booth

Dean, Apprenticeship and

Related Trades

to

BOARD OF TRUSTEES

MT. SAN ANTONIO COLLEGE

WALNUT, CALIFORNIA

1970

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## I. ACKNOWLEDGMENT

I thank the Board of Trustees for granting me the time to take a most informative and interesting tour of our country. Through it I was able to secure many statistics relating to equipment, materials, personnel, safety practices, training, and site selection and development.

Most of the construction industry has the view that mistakes and problems are a positive factor in product development.

After returning I am enthusiastic about continuing when and wherever possible with some of the contacts made. The broader viewpoints gained will improve my relations with the students, the instructors, and the advisory groups that will ultimately reflect the Mt. San Antonio College educational program in our community and throughout the country.

Again, I want to express my appreciation to the Board of Trustees and to the Administration for providing me the opportunity to undertake this sabbatical leave.

## II. PURPOSE

To secure materials which will help convey to instructors and students of Mt. San Antonio College Technical-Vocational Education a realistic understanding and appreciation of the overall construction industry, as workers today freely move to various parts of the country seeking work.

### Basic Objectives:

1. To encourage a two-way flow of information between the academic community and the construction industry which will foster maximum understanding and appreciation of the role and contribution of each in the American Socio-economic system. To create an atmosphere of mutual understanding.

2. To develop and distribute material which will enable instructors and students to evaluate career opportunities within the construction industry.

3. To make educators and students aware of the construction industry's contribution to the solution of socio-economic problems, such as education and personnel development activities, employment of minority groups, improvement of substandard housing, pollution, and industrial relations.

4. To evaluate existing and proposed educational programs involving the endorsement, participation, and support of the construction industry.

5. To show how the industry seeks to assist educators by planning curricular requirements with them. Many industries provide community resource workshops for instructors,

apprentices, journeymen, inspectors, designers, engineers, administrators, and managers. Grants, gifts, and films are also given, and speakers are provided.

The study involved mainly high-rise structures, waterways, bridge designs, and fabrications that include the crafts of many employees.

### III. PREPARATION FOR SABBATICAL LEAVE

A great deal of preparation must be made prior to leaving for two months from your regular work. Although the leave was during the summer months, Mt. San Antonio College had summer school classes that necessitated materials, supplies, and repairs of laboratory machines where parts must be purchased during the overhaul. Some advisory committees meet each month of the year and for that reason M.S.A.C. had representatives to cover the sessions.

With a trip of this extent one covers many miles by side trips, following leads, locating areas of interest, and just good traveling. It was necessary to secure letters of introduction to the various building trade representatives of the projects to be visited. Their counterparts are those whom I work with locally; i.e., safety engineers, state and local vocational supervisory training trust agents, and business agents of labor union groups.

On any project, large or small, whether with a letter of introduction or not, I was able to enter "hard hat areas" and get desired information by presenting the M.S.A.C. card that indicated my area of instruction.

I visited high-rise structures, bridges, tunnels, waterways, large fills, underground railways, production plants, and a water tunnel where seventeen men were killed.

The benefits derived were well worth all the local contacts and planning that went into the leave. I hope the students, instructors, and advisory groups with whom I work will be adequately compensated.

#### IV. REPORT ON STUDY

There are many problems today in construction that were not here a decade ago; i.e., selection of materials, controls--local, state, and Government--greater problems of help, etc., with incompetency from top to bottom. My reason for selecting this kind of sabbatical was not to be a part of the problem but to assist in the answers.

Our biggest problems lie in the deplorable highway system throughout the country. These will be discussed later in the report. We traveled over 10,000 miles, through 28 states and two provinces of Canada--with two separate trips into Canada. The report contains, also, maps of the areas visited, with many pictures taken on the scene of equipment, materials, buildings, people, brochures, and prints.

My wife and two other school teachers were in our party and a minimum of time was spent in rest and eating. It was a great pleasure, however, to enjoy the many well-known dining places throughout our country and Canada. Ford Times, saved for many years, gave us numerous leads on a variety of foods. Comparing good motels and some hotels also added to the interest of our trip. While in appropriate areas, we took time to visit historic spots, local schools, museums, state capitols, and other interesting places. A "Scenic Land USA Guide" was of great help to us. Maintaining Rotary perfect attendance also provided us with good contacts.

Our itinerary called for us to travel through the middle of our contrasting country with the first stop for a dedication of the Button Rock Dam and water filtration plant of Longmont, Colorado. We stopped at Ogallala, Nebraska, a most historic spot in our country, and purchased several books. North Platte with Buffalo Bill Cody's treasures was our next stop. A tour of Boys' Town, Nebraska, took in all the classrooms, laboratories, gyms, administration, and farm, covering 1700 acres. It has many immense brick buildings. Here we purchased more books.

Omaha, Nebraska, had the first real high-rise structure we visited. The Union Pacific Lands Division is erecting a 22-story office and parking complex, with Robert Burton as the superintendent. (See page 3 of the Union Pacific Development Program Release.)

We visited the capitol and museum in Des Moines, Iowa, and the library of Herbert Hoover at Westbranch. We visited a one-room white school house and 4H Project and farms in Maysville, Iowa. Farm machinery of various ages was much in evidence.

The 14th floor of the Essex Motel on Michigan Avenue was our stopping place in Chicago. We visited the Illinois Vocational College, the Y.M.C.A., and Grant Park with Buckingham Fountain and a band concert. We had a day's tour of the Field Museum. Don Edinger is a curator in charge of a coordinated city-wide educational program. He explained their free loans of exhibits to the Chicago schools and showed us their behind-the-scenes work laboratories.

I lunched with Rotary Club #1 and visited the Rotary Headquarters. We visited many offices in the new Chicago civic buildings--particularly the water reclamation with various chemical labs and engineers. O'Hare has a huge program of expansion in progress. We observed many striking examples of unusual architecture in Chicago; for example, the "corn cob" apartment towers, the Merchandise Mart, and the John Hancock Center.

We stopped at the "Fallen Timbers" Museum of Mad Anthony Wayne, who won the Northwest Territory from the Indians for the U.S. Buffalo and Niagara Falls provided many interesting sights, and we were especially interested in the equipment for handling the water intake and the outlet for the hydroelectric power. We got a scenic view from the Skylon Tower, 520 feet in height.

The Eastman Company in Rochester, New York, has an information center and gives tours twice a day through the camera manufacturing plant. We, also, visited the Hawkeye plant, where all the optics are produced. George Eastman's former home has been set aside as a national monument to American greatness and history. It contains a museum of photography. The Dryden Theater, which was given in memory of Eastman, is on the grounds of the Eastman home and is worthy of a visit. The Eastman School of Music is next door to the Eastman Museum.

The Corning Glass Works are in a large program of refurbishing and expansion but most impressive is their museum with wonderful exhibits of glass from 1500 B.C. to the current designs. On our tour was included the Steuben Glass Factory, a subsidiary, where we watched men blowing and turning beautiful pieces of glass into figures of animals, flowers, etc.

In Elmira, New York, and Troy, Pennsylvania, we visited relatives who collect sugar shakers, caliope, and many other antiques. Our next tour was through E. I. DuPont de Nemours at Wilmington, Delaware, where the original Chambers Works plant is expanding its Freon Division. Freon, a DuPont patent, has five plants throughout the United States. Stanley Ford, Manager of the plant, gave me a private tour through the entire facility, including the museum.

We spent several days in the New York-New Jersey area seeing power stations, bridges (old and new), tunnels, and high-

rise structures. The most outstanding structure was the new World Trade Center, located between Church, Liberty, Vesey, and West Streets in New York. The complex will cost \$750 million, rise 1350 feet, and contain nine million square feet. It is radical in concept, daring in design, and is a dazzling engineering achievement that will be completed in 1973. Two of the world's leading architectural firms, Minoru Yamasaki and Emery Roth & Sons, were engaged by the Port Authority to start work in September, 1962. My guide for the day was Donald Herbstman, P.E., who covered the entire project. Thirty-three major world banks have signed for space. Over 700 tenants have signed rental contracts, and some of the reservations extend to the year 2070. It will provide nine more acres of rentable space than all eighteen buildings in the Rockefeller Center, and eighty more acres than the world's largest office building, the Pentagon. It will have ten million, or 230 acres, of usable space. Five thousand to seven thousand workmen were employed by 146 contractors. They have used 525 structural iron workers (Seneca and Mohawk Indians). (See brochures and pictures.)

We left New York and drove on to New Haven, Connecticut, where we visited the campus of Yale. In Hartford we visited the capitol building and grounds.

We next stopped at General Dynamics Electric Boat Division at Groton, where we visited their in-plant training program, which is similar to the General Dynamics Pomona Education Section.

The historical society of Narragansett Bay has opened many fine mansions to the public. Some of the larger homes have been turned into private schools. Hyannisport and the many sights of interest at Cape Cod was our next stop. Plymouth, with all its historic spots and many antiques, took a good day of investigating.

A strike by the construction trades had tied up building in Boston, but concrete was being poured on the new Aetna Insurance building. Much interest of a historic nature centers in this area, such as "Old Iron Sides," at dock in the Boston Navy Yard. We observed a large slum clearance and redevelopment program going on in Boston, as in many other major cities of the New England states. It was very easy to get onto any of the job sites if first you would contact the safety director of the project and indicate your affiliation with the school and construction associations. Your hard hat under arm also acted as a good pass into the work areas.

We stopped at White River Junction, Vermont, near which we visited a maple sugar mill and museum of early day machinery. We stayed that night in the Coolidge Hotel, named for Calvin Coolidge's father. A lumber mill was next visited, where the handling equipment does not have to be so large as in the Western mills, as their logs and timbers are much smaller. We drove to Hanover to visit the picturesque campus of Dartmouth, looking over various instructional areas and talking with students. The beautiful farming

country was just like the many pictures we have seen of it.

Before entering Canada, we stopped at the U. S. Customs, where we listed our cameras, etc. to help when we reenter the U.S. We drove all over Montreal to get pictures of many apartments with attractive outdoor stairs. Some construction was in process, and the site of the World's Fair Expo was being used as an amusement center, with all of the features left intact plus many new attractions. We followed the St. Lawrence River with its many interesting aspects down towards Ottawa, the capital of Canada. We enjoyed the 10 a.m. changing of the guard in front of the Parliament Building. A military band with two platoons of snappily dressed Mounties performed for the inspection ceremony. We toured the museum and Parliament Building. English speaking and French speaking visitors were taken on separate tours. The new downtown mall is open but much construction is still in process. Unique architectural designs were very much in evidence; i.e., a promenade for offices and car parking. The Lord Elgin Plaza, a 23-story plus pent house, had no safety director or coordinator on the job. A city safety inspector checks the job two or three times a week. The owner and superintendent of the building gave me brochures and a tour of the construction that was up to the 20th level. Frequent road signs near Ottawa would indicate Squeeze Over.

Our next stop was at Sudbury, where Thomas Edison was the first to discover large metal deposits in place. Some of the

largest known nickel deposits in the world are here. We had the private tour of the Falconbridge Works by Walter Sorenchek. We were given brochures and many ore samples to bring home. They have a solid vein of nickel 6000 feet long, 400 feet wide, and 2 miles deep, a 40 year reserve. The mining began in 1928. The matte, 52% nickel, is sent to Norway for final processing. After the tour, a spicy French style tourtiere was enjoyed in Sudbury's newest Peter Piper Inn, which was attractively finished in redwood.

Next we came to Sault Ste Marie, where crowds of people were having a community day gathering at the Bruce Mines. All proceeds were to go for lights in their park. A parade, exhibits, foods, etc. showed the great interest and spirit of cooperative civic pride they had. The International Nickel Company recently purchased the entire holdings of the Bruce Mines.

Four locks of the Soo are owned by the United States and one by Canada, and they are still free. We had a delicious whitefish dinner on Lake Superior at the Marina Club. We took many pictures of mine head frames and the loading of ore boats at Duluth.

The Maxson Construction Company of St. Paul has a large contract for building steel bridges. Their chief inspector, Robert Manson, took me through the entire facility and out to several job sites that took several days to see. St. Paul has the Minnesota State Highway Test Lab. It was, also, my good fortune to visit it. All bridge spans are steel fabrications. No prestressed, post tension concrete is used because of extreme

weather conditions. The first pre-stressed beams were developed and poured in Pennsylvania in 1940.

We enjoyed a fine dinner at the famous Charlie's, an old English style restaurant in Minneapolis. Our next stop was a visit to the largest plumbing contractor in Minneapolis, Eagan's Plumbing and Heating. Their work is now 100% commercial and industrial. Weather conditions require some different techniques, but their apprentices go through the same time and training program as the Western students because the educational materials are provided by the United Association of Plumbers, Washington, D.C.

The St. Paul Technical Vocational School has outstanding buildings and facilities to make possible their well rounded programs. It is under the St. Paul Public School system. A good rapport between faculty and students was evident. Our guides were George Edberg, Assistant Superintendent of Instruction, and Charles Simmer, Principal of the Institute, who generously provided brochures and bulletins.

Fargo, North Dakota, had several large silos under construction, in which formed Cor-ten steel was being used. Valley City, North Dakota, has the state office for school activities. Mr. Francis Smith, Director, explained their work. He coordinates all of the high school activities for the state of North Dakota; whereas California has a director for each district.

At Bismarck South Dakota has a new and radical capitol building that houses a very interesting and complete museum of the struggles and progress they have had through the years. A huge

statue on the grounds honors Sacajawea.

Richardson, North Dakota, started by a shipping magnate by that name, imported Germans to develop the town and build an abbey that is now operating as a junior college.

Next we visited the historic town of Medora and the Theodore Roosevelt National Park. At night we enjoyed a musical vaudeville program that ended by honoring the Marquis de Mores, Emperor of the Badlands, and Teddy Roosevelt. Both men had ranches and lived near there. The grandson of the Marquis de Mores, Antoine de Vallambrosa, who lives in Paris, was visiting the town. He had sold his entire holdings to Mr. Harold Schaefer, President of the Gold Seal Company, who is now restoring the old town of Medora and is sponsoring tourist attractions. We met Mr. and Mrs. Schaefer and invited them and Antoine de Vallambrosa to visit our school whenever they might be in our vicinity. We purchased a book on the life of the Marquis, which the grandson indicated was true to facts. He had proofed the details but as yet had not read the entire book. After he autographed and wrote a note in our book, we drove up a hill to the old Chateau of the Marquis, which is now a museum. Most of the original furniture and the clothes are still intact.

A few miles west on Highway 94, we stopped at "Home on the Range," where 42 boys of all denominations live, train, and work. Their facilities consist of 1500 acres of land, 4000 chickens, 300 head of cattle, a grade and a high school. The buildings are one story brick and look good. It is small in numbers of

boys and buildings compared to Father Flanagan's Boys Town, but it will surely grow.

North Dakota's Highway 94, crossing the middle of the state east and west, was exceptionally good. It was another continuous pour project. From here west through Lewiston to Great Falls, Montana, was the best example of strip farming on the great grain fields of that country. Next we took a tour of Great Falls, including Ryan Dam and its hydroelectric turbine station. The Anaconda works at Great Falls were producing 40% of capacity. General Mills has a complex of 20 grain elevators near the Missouri River in Great Falls. The Giant Springs nearby, with its huge trout hatchery, has a great historical background. It flows 380,000,000 gallons of water every 24 hours, with a temperature of 52° the year around.

We traveled west on Highways 91 and 92 through the Blackfoot country and had lunch at St. Mary's, the entrance to Glacier. The boys and girls who work there during the summer are from St. Paul College. St. Mary's Inn is famous for good food, especially the locally caught whitefish. Through the Park and over the "Going to the Sun" road, we encountered very strong winds that hampered picture taking, but we managed to get some fine shots anyway.

Flathead Lake, near Kalispell, has Black Eagle Dam, primarily built for high water control.

We then took the Bitterroot Pass through the mining towns of Wallace and Kellogg, which looked very prosperous as the mill and smelters indicated much activity. In Idaho we also visited

with friends employed on the new Mall in Coeur d'Alene. They took us to the lake of the same name, as they have a new 22-foot boat.

After a short stop in Spokane to visit relatives, we went on to Highway 395, where a road sign near Pasco, Washington, read "Take your time, not your life." Traveling Rain Bird sprinklers were watering large fields in a new agricultural area. Grand Coulee Dam provides the water to land that is becoming one of the largest potato and alfalfa centers in the United States. Some large grain barges and log booms were traveling down the Columbia River. Many new grain elevators and docks have been constructed to help transport the produce from the back areas. We saw the Atalia steam plant on the river.

Pendleton Woolen Mills have an interesting tour through their original plant at Pendleton. A large sign across the main street advertising the coming round up said, "le-loi-min"--welcome.

We again visited the project of the Sacramento, Pitt, and McCloud rivers, Shasta Dam (Central Valley Project). The next major interesting project was the start of the Feather River Project, Oroville Dam. I recall all of that area in the 1920's, from Reno, Nevada, to Oroville. Before men built the many roads, dams, and hydroelectric plants for P.G.&E., lumber companies, and the California water resources program, it was not the beautiful drive highlighted by views of Lakes Oroville, Butte, Almanor, Eagle, etc. that it now is. All are useful, supplying dependable water and power supply to city and farm, and they give pleasure to thousands who seek peace or recreation. One has but to remember the many

disastrous floods of the Feather River, where the angry waters brought death and destruction to Marysville, Yuba City, and many more down stream areas, to appreciate man's contribution. We have today too many talking conservationists who (i.e., Ralph Nader) have neglected to inform themselves as to the conditions existing in a wilderness area. Creative men formerly took the land and built protection, beauty, and useful projects; the uninformed now wish to conserve through abolishing everything. They would be the first to shout if their water or power service were not as we enjoy it today. Many treacherous rivers, unhealthy sloughs, and swamps have been developed into beautiful recreational spots that afford pleasure and a living to millions of individuals. The obstructionists and preservationists should make the effort to learn the history and problems that were here before the true conservationists and creators put their knowledge and efforts to work to make a better life for all mankind.

Of all projects visited, the California State Water Resources Project was by far the most encompassing, as so many agencies with so many talents are involved. It was of great interest to travel and visit both completed and in-process projects from the north coastal long range, "water bank," to San Diego. This included Shasta, Feather River, San Luis Peripheral Canal, Central Valley, Wheeler Ridge, Wind Gap, Edmondson, and Foothill Feeder, with all siphons, pipelines, tunnels, and controls--Glendora Tunnel, Joseph Jensen Filtration Plant, Castaic Y, Auld Valley, San Diego Canal--pipelines and countless distribution systems. I had several meetings with California Water Resources representatives, MWD, EMWD,

and local water district personnel.

American Pipe and Construction Company, through its Product and Development Division, has built some of the largest and most efficient handling equipment in the world. (See brochures.) Its motto is "Where the key word is innovation."

To appreciate the value of the vast California State Water Project, we must look at the entire state picture. We can realize its accomplishments by remembering how the melting snows from the Rockies each spring used to make a rampaging giant out of the Colorado River. Its waters were wasted in floods that destroyed everything in its path as it streamed uselessly into the Gulf of California. It would settle down to a trickle during the summer until next year's storms once again turned it loose. The Eel River in Northern California today, with its annual ravaging floods, is a basic example of opposition to sound water development. Environmental planning should be done by responsible, thinking people who know of the traditional benefits associated with water projects, flood control, water supply, recreation, and fish and wildlife enhancement. A serious problem to ponder is the increasing salinity of the Colorado River, which poses a huge threat to all users of its waters. Annual damage in California may exceed \$40 million by the year 2000, as the salinity will increase from the present 740 parts per million (ppm) to 1340 ppm at Yuma.

The Atlantic Richfield Plaza in Los Angeles was observed from the demolition of the existing buildings to the completion of the twin 52-story towers at a cost of \$160 million. The most unique new feature was the twelve-foot wide moat of pea gravel from

footings to ground level. This will provide flexibility to the all-structural steel buildings during an earthquake.

John Heeks was my guide on a tour of Orange County's newest community, called "The City," where Orange County's tallest building now stands, an eighteen-story office-bank complex.

Another innovation, located in the Newport Plaza, is the five-story Rodeffer office and store complex, where vertical prestressed columns were set and plumbed. A pneumatic pump was mounted atop each, with cables hanging to the ground. Forms were built around the entire periphery of the building, with clearance around each column. Re-bar was installed within the forms and concrete was poured. When cured, the entire floor for each level was raised by the pneumatic motors. Each was locked into place before proceeding to the next floor. A great volume of compressed air was used on this project. It was my pleasure to ride up on the second-floor level that travels approximately four feet an hour.

No study of this kind could be made without seeing some obvious areas for improvement. In nearly every case the engineering and designs indicated good sound practices. The one exception, however, was highway construction. After centuries of building roadways, there still seems to exist a great deficiency in the planning and layout of intersections and in providing needed information to those who will use the freeways. The only thing consistent in on and off ramps is the inconsistency of their approaches. Condemnation for rights of way can not be the excuse, as many times a costly bottle-neck is made in place of an obviously easy access or egress. Bridges, cuts, fills, etc. are well constructed. Many lay

people who use the freeways could assist in the greater competency of highway planning if allowed to make suggestions.

## V. INNOVATIVE CONSTRUCTION PRACTICES

I visited many projects throughout our country, large and small, and I must thank all the people who personally took me or arranged for guides to take me into so many places; locations that one would never dream it possible to get into.

I rode mine cars, concrete trains, helicopters, skips, elevators, boats, plus many vehicles to visit on-site jobs.

Interesting and new concepts that were observed were described throughout the text part of this report.

Participation in superintendents, stewards, and safety directors' meetings provided me with very helpful information, with printed materials, and with prints that are now in the hands of instructors.

VI. STATEMENT OF HOW SABBATICAL  
WILL HELP ME SERVE MT. SAN ANTONIO  
COLLEGE BETTER

It has always been a great pleasure for me to visit construction projects: before, during, and after completion; i.e., Colorado River dams, Metropolitan Water Department work, All-American Canal, bridges, some of the architectural delights of Mexico, mining operations in Alaska and Canada, high rise building in the Hawaiian Islands, the huge structures of Europe and Great Britain and the many problems of rebuilding following World War II, the many large plants and water projects of the middle and eastern states, the mammoth mining operations of the western and northern mines, those of the Mesabi, etc.

Safety practices have always been of great importance, and while attending a safety meeting on a large project, a report was made of a worker who had been burned. He was an unkempt person with long hair and beard, known on the job as a kook. It took three men to put the blaze out. As a result of this trip, we are offering more up dated material in our courses, through a better understanding of needs and a closer relationship with advisory groups.

We have entered the field of environmental control that will soon be another program for certification.

Schools are charged with the responsibility of preparing people for a better life and greater contribution to our society. Not so! We can't be the answer to everyone's desire and whim. Let's teach

knowledge related to lifetime occupational needs; then as successful employees they can secure the necessities of life, cultural needs, and desired pleasures. We should leave something for people to work for and to anticipate for the future. The first years of man must make provision for the last.

This sabbatical, with its variety of grand experiences, was one of the most worthwhile pleasures of my life. I expect to very soon travel to many of the same places to visit for a longer time. The cordiality accorded by the men interviewed was proof of their respect for Mt. San Antonio College.

