

PROPOSED TUNNEL ROUTES
CONNECTING SAN DIEGO WITH THE EAST

ROUTE	LENGTH	ELEVATION OF EAST PORTAL	ELEVATION OF WEST PORTAL	GRADE	DISTANCE TO SAN DIEGO PLAZA	DISTANCE FROM EAST PORTAL TO POINT "A"
1 XXX	13.5 MILES	2600'	950'	2.31%	35.5 MILES	
2 ===	18.3 MILES	1750'	850'	0.9%	35 MILES	19.5 MILES
3	32.2 MILES	800	775'	0.01%	28.5 MILES	5 MILES
4 ~~~	34 MILES	1100	900	0.2%	24 MILES	6 MILES

PREPARED BY G.S. POWELL
LICENSED LAND SURVEYOR
FOR THE ED. FLETCHER CO.

OUTLINE OF PROCEDURE AND PERTINENT FACTS

ON

FACT FINDING COMMISSION OR BOARD

TO

STUDY A TUNNEL THROUGH THE MOUNTAINS

TO THE EAST FROM SAN DIEGO, CALIFORNIA

AND

ALSO A STUDY OF THE EFFECT UPON THE IMPERIAL VALLEY,

THE CITY OF SAN DIEGO AND SURROUNDING TERRITORY

AND THE CITIES NORTHERLY ALONG THE PACIFIC OCEAN

TO LONG BEACH, CALIFORNIA AND ALSO SOUTH OF SAN DIEGO

TO THE PENINSULA OF LOWER CALIFORNIA.

BY

CHARLES H. YOUNG

CONSULTING ENGINEER

MUSCATINE, IOWA

May 26, 1949

Compliments of John C. Abbott.
Chairman Fact Finding Board.
San Diego County Highway Assn.
Address P.O. Box 162. Spring Valley Calif.

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TO WHOM IT MAY CONCERN:

A.

It seems necessary and helpful at this time to try and analyze a procedure on the construction of a tunnel through the mountains East from San Diego, California and the effect of such construction upon the territory benefited.

B.

In enumerating the studies to be made by the Fact Finding Board, which is being selected to make these studies, it would seem that the major divisions to study would include:

1. FOREIGN TRADE
2. HARBOR DEVELOPMENT
3. RAILROADS
4. HIGHWAYS
5. AQUEDUCT
6. INDUSTRIAL DEVELOPMENT
7. WATER RESOURCES
8. RECREATION
9. LIQUIDATION AND TUNNEL DESIGN
10. POLICY

C.

In enumerating the benefits to be derived from such construction, a preliminary analysis is as follows:

1. It would place San Diego on a main line railroad rather than on a stub line.
2. It would develop the fine San Diego Harbor.
3. It would encourage development of foreign trade and a vital connecting link with the Panama Canal.
4. It would give the Imperial Valley and points east an economic outlet to a good harbor.
5. It would benefit the coast cities as far North as Long Beach and would also open up better trade connections with the Mexican peninsula of lower California which has many natural resources.
6. It would encourage industrial development.
7. It would enhance property valuations and increase the trade area of both the San Diego area and the Imperial Valley area. It would also furnish employment during depression periods.
8. It would provide a more economic conduit for water which is now one of the most needed assets for future development.

9. It would save many dollars in auto and truck transportation on highways.

10. It would give new life and incentive to dormant energy in the territory benefited and attract new energy.

FOREIGN TRADE

In exploring the first item or "Foreign Trade", it would seem that information should be gathered regarding the volume of trade and this trade broken down into exports and imports and the economic value of such trade, as near as possible, in the Puget Sound Harbor area, San Francisco Harbor, Los Angeles Harbor and the existing status of the San Diego Harbor because such an analysis would give the exact picture of the experience at other locations.

Also, it would seem that an analysis of the Panama Canal should be made including the same factors and whether or not it would be beneficial to be located 100 miles closer to the Panama Canal than any of the other three harbors enumerated above. Also, it would seem that this study would be more valuable if a breakdown were also made of the character and sources of such exports and imports. Of course, there will be many other items when an experienced person analyzes the foreign trade problem with specific application to the San Diego harbor and of course, all the information secured should be in written or documentary form.

HARBOR DEVELOPMENT

Regarding Item 2 under Division B relating to "Harbor Development", it would seem that an analysis of the existing activity should first be studied and then the harbor divided into its proper divisions of military, recreation, industrial and other purposes for which it is adaptable. Then, it would seem that plans should be perfected for future development and it is understood that plans have already been made for the reclamation in the lower harbor of some 2000 acres by dredging the silt and placing it on the side lines. This also brings up the question of silt control, and soil conservation advocates claim that they can reduce the soil discharge from streams to about 5% and several methods are used which include contouring, construction of small lakes, protection at the toe of major slides and the construction of silt basins in the upper reaches of the streams. As noted in a former letter, a great deal of silt seems apparent on the U. S. Geological maps at the mouths of the Otay, Sweetwater, Paradise Valley in the lower San Diego Bay and also in Mission Bay at the mouth of the San Diego River. This problem of silt is an important one because many harbors have this problem to solve and its solution should be given proper study in the harbor development information gathered. It is believed that co-operation of Soil Conservation Department is essential. Then, of course, there would be questions of docks and railway storage yards and terminal facilities on the harbor to accommodate rail and truck transportation.

CORRECTION

June 2, 1949

Mr. John A. Abbott, Chairman
Fact Finding Board
Box 162
Spring Valley, California

Dear John:

I have your letter of May 30, 1949 and you were correct in the West approach from San Diego Bay to Mr. Hansen's West portal. The Geological maps are on a scale of 1 inch per mile and the distance should be 21 miles instead of 49 miles as noted on page 3, paragraphs 2 and 3.

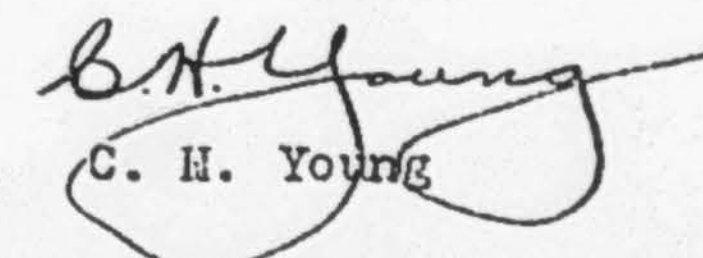
So, the last part of paragraph 2, page 3 should read as follows: "It reveals a distance of 21 miles which if multiplied by 42.24 feet per mile would equal an allowable elevation of the West portal of 887.04 feet.

Then strike the first six lines of paragraph 3, page 3. I presume that in scaling the distance, the error was made but this correction is valuable because it reveals the fact that all documents and material should be in written form where various members of the Fact Finding Board and their committees can offer suggestions and corrections. So, a copy of this letter is being sent to the 17 people to whom I mailed the copies of this report.

As I wrote you in a letter yesterday, it is believed that the Outline forms a foundation to encourage suggestions and additional ideas from the various members of the Fact Finding Board and their committees when selected. It is also believed that each member of the Fact Finding Board should write his ideas of the facts presented in the Outline and then also include in his letter to you, as Chairman, any additional information that he can offer by reason of his experience with local problems or problems elsewhere that I am not familiar with. After all, I was only in San Diego three weeks and evidently would not be able to be as well informed with local problems as members of the Fact Finding Board. It is also believed that a definite outline of procedure should be developed and adopted after all parties have expressed their views.

My only purpose in preparing this information is to help you as a friend and to try and assist in a problem in your community that would seem to be for the betterment of your Civic problems, and since I am retired, it gives me something interesting to think about.

Very truly yours,


C. H. Young

RAILROADS

In exploring Item 3 under Division B regarding "Railroads", of course, this item is also very important since it will involve the approach to the various railroad systems and of course, will include the question of economy and the policies of the railroads and much will depend upon the location of the tunnel in reference to economic connection to the tunnel. In studying the three deltas namely, the Otay River, the Sweetwater River and the San Diego River, it would appear that the Sweetwater River Valley would be the most adaptable to terminal facilities which would include terminal and storage yards and proper connection to the industrial areas and it is believed that the existing harbor front is too congested to afford the location of the necessary terminal yards.

In talking to Professor Ralph A. Moyer, who is Expert on Travel for the State Highway Commission of California and has been directing many studies on skidding, friction, etc., he stated that the most economic grade for railroads would be .8 of 1% which would be 42.24 feet per mile and in drawing a preliminary line along the Sweetwater River Valley from the Harbor to the West portal of Mr. Hansen's proposed tunnel on the U. S. Geological contour map, it reveals a distance of 49 miles which if multiplied by 42.24 feet per mile, would equal an allowable elevation of the West portal of 2,069.76 feet.

However, the East end of the 49 mile distance is nearer the mountains and the natural surface is much steeper than in the lower part of the Sweetwater River Valley. So, an elevation of 2,000 feet for the West portal would be impossible unless a location were planned farther to the North where a longer approached distance could be secured and a shorter tunnel for railway purposes designed. The northern routes, however, would increase the distance and therefore decrease the miles saved. But, Mr. Fred Pyle, Hydraulic Engineer of San Diego, advised me that along the North tunnel routes there were two faults and that they had studied and had made maps showing the location of these faults. He also stated that in going through these faults with the tunnel, that some engineers were widening the tunnel about three feet and making the concrete heavier and reinforcing it before any raveling occurred in the fault.

Also, in analyzing the grade from the East portal of Mr. Hansen's design East to a point on the highway and railroad just West of Plaster City, California, a line was drawn on the U. S. Geological contour map and this distance appears to be 22 miles but the elevation of this point about a mile west of Plaster City, California is already 128. So, using a grade of .8 which would equal 42.24 feet per mile and multiply this by 22 miles, the result would be 929.28 feet of elevation and adding 128 feet elevation mentioned above, the result is 1,057.28 feet. However, if a 1% grade is used, this would make 52.8 feet per mile and on 22 miles would result in a 1,161.6 feet of elevation. Of course, a longer east approach could be obtained if desired.

Of course, an actual survey will bring out all of the facts and ultimately the railroad companies will no doubt be the best advisors when their viewpoint is analyzed.

HIGHWAYS

Regarding Item 4 under Division B or "Highways", of course, the Highway Department of the State of California are already constructing a highway with a maximum of a 4% grade along Route 20 on the West slope and it is understood that this will cost in the neighborhood of \$16,000,000 and that considerable work will be performed with convict labor. It is also understood that the Federal Bureau of Public Roads would not approve a grade of less than 4% for economic reasons and it is also understood that the proposed highway construction along Route 80 under this project will eliminate a number of steep grades and bad curves on the West slope of the Laguna Mountains and that there is still another project to be performed on the East slope of the Laguna Mountains. It is also revealed that the maximum grade on the Pennsylvania Turnpike is 3% and that there are many states who have a policy of a maximum grade of 5% but of course, they seek a lower grade where it can be economically secured.

In this connection a study was made of the length of the highway between El Centro and Long Beach. One study was made by using available Highway maps and proceeding along Route 99 and 60 to Riverside, California and thence on State Route 18 to Long Beach and this resulted in a distance of 220 miles. Then, as a comparing route, following West from the same point at El Centro via existing Route 80 and 101 to Long Beach, the distance was found to be 222 miles or 2 miles longer. However, in analyzing the proposed tunnel route, it proved to be 22 miles shorter than the existing route on U. S. 80 resulting in a saving of 20 miles if a tunnel were constructed. Some maps give the distance from El Centro to Long Beach via Riverside as 210 miles and others 213 miles. So, this should be checked when curves and slow order miles are determined by actual travel of routes.

A study was also made of a comparative route between Amarillo, Texas to San Diego by using U. S. 66 to San Bernardino, California and then using Route 395 to San Diego which resulted in a distance of 1,211.3 miles. Then, the route from Amarillo West to San Diego was analyzed via 60-70-86-84 and 80 through Roswell, Lordsburg, and Tucson to San Diego and this distance was found to be 1,102 miles over the existing route or 109.3 miles shorter than the 66-395 Route. And, if a tunnel were constructed, we would add 22 miles to this saving in distance or have a total saving in distance on Amarillo, Tucson to San Diego Route of 131.3 miles.

Of course, this route eliminates the loop to El Paso which is 82 miles longer than the route described above. It also eliminates the Douglas loop which is 60 miles longer and it also eliminates the Phoenix loop which is 74 miles longer. There is being sent a colored map to the Secretary of your Highway Development Association, Mr. Robert Apitz, which can be used in the study of this analysis.

Also, since the existing distance along Route 80 between El Centro and San Diego is given by the American Automobile Association as 120 miles and the distance from El Centro to San Diego via Riverside, using 99 and then using 395 to San Diego, the distance is 268 miles making the distance 148 miles shorter and if the 22 miles saving on the tunnel used, then we would have a saving of 170 miles to San Diego via the tunnel route as compared with 99 and 395 via Riverside.

Of course, these are comparisons and should be checked and verified and they are merely being analyzed to determine the facts and advantages of creating a short route having a minimum grade. There is no question regarding the economy of the much less grades on the Amarillo-Tucson Route to San Diego as compared with the U. S. 66-395 Route which proceeds over the mountains and is impassible at times because of the snow. All of these facts, of course, will need to be thoroughly studied but this preliminary exploration of facts will assist in arriving at conclusions and there has been placed upon the highway map being sent to the Secretary, other roads in color showing their trend toward the Southern route and as the route is shorter and has a much better grade and these facts are determined and well advertised, the results are apparent regarding the highways.

The question of distance is not the whole story because Professor R. A. Moyer, who made experiments for the Federal Bureau of Public Roads, discovered that in traveling around a curve, the extra gasoline is about 10% greater than it is on a tangent and that starting and stopping increase the tire wear 80% and for all grades above 4%, on an automobile the tire wear is increased 25% for each additional percent of grade and on trucks for each percent of grade over 2%, the tire wear increases 25%. So, it would be of great importance to study the number of curves, the slow order miles through towns and the number of miles of each percent of grade in order to make a proper comparison. What is needed in the San Diego area is not a road that will equal other roads but will be a distinct improvement on other roads and it certainly costs more to climb a grade of 5% than it does to climb a grade of 1%. These comparisons should be determined by actually traveling the routes and securing profiles of the highways and the railroads from Amarillo, Texas to San Diego. I am filing with the Secretary, a copy of a profile of the Santa Fe Railroad showing the grades encountered and the elevations reached and it should be easy to obtain comparative grades on other routes.

In regard to Professor Moyer's studies, the following is a letter explaining his experiments and there is also a discussion of the benefits to the 92 Highway in Illinois, Iowa and Nebraska that we derived from Professor Moyer's studies. This conclusion regarding the 92 Highway is applicable to your route.

C O P Y

Iowa State College
Ames, Iowa

February 7, 1942

Mr. C. H. Young
1610 Mulberry Avenue
Muscatine, Iowa

Dear Mr. Young:

I am enclosing some material which you requested in your telephone call several days ago. The following information is also along the same line.

In regard to tire wear the curve for normal tire wear on Iowa concrete is given in Chart 1 of the enclosed reprint. This involves one stop on an average of every 4 1/2 miles. The average speed of Iowa traffic on long trips is about 42 m.p.h. including travel through towns. On the open road it has been close to 50 m.p.h. until recently. Of course, with the rubber shortage these speeds do not apply to present traffic.

In tests on the effect of braking we found that doubling the number of stops increased the tire wear 80%. In another series of tests in which stops were made approximately every 500 feet, the tread wear was 7 times greater than for normal driving at 25 m.p.h. with stops every 4 1/2 miles. The average speed with stops every 500 feet was 14.3 miles per hour.

The tire wear on curves varies greatly depending upon the radius of the curve, the banking on the curve, and the speed of the car. Taking the usual range of speeds on curves for all traffic, our tests indicate that the tire wear on curves averages about double the wear on tangents or straight road sections.

Tire wear due to grades is negligible for grades less than 4% for cars and 2% for trucks. For each percent increase in grade above these values, the tire wear increases approximately 25%.

The increase in operating cost due to extra travel distance can be obtained from Chart 2. An additional 1 cent per mile should be added to these cost for maintenance and depreciation for which no difference due to speed could be determined in our tests. Our tests indicated that a good average operating cost figure for gas, oil, tires, maintenance and depreciation is 2.6 cents per mile at 42.5 m.p.h. average speed on concrete pavement.

You will note that on the reprint more recent data are given for gas consumption when frequent stops are necessary than are shown in the mimeograph report.

The extra gasoline for curves is approximately 10% greater than for a corresponding length of tangent. The extra gasoline is due to

grades about 3% and amounts to about 5% for each percent increase in grades up to and including 6%. A more important factor effected by curves and grades is the speed factor. That is sharp curves and steep grades add a considerable figure to the time cost. There are so many variations in curve radii, in grades, and in types of vehicles that I cannot give you the values for the time lost for all of the various conditions involved due to factors.

Yours very truly,

(Signed) Professor R. A. Moyer

C O P Y

Regarding the SAVING OF RUBBER when applying Professor Moyer's facts on the 92 Highway, it is considered that this is one major objective since it will be noted in a copy of letter enclosed from the Iowa Engineering Experiment Station of Ames that the effect of braking or stopping on double the number of stops increased the tire wear 80%, and is it not true that on the 92 Highway there is a saving of an average of 40 MILES OF "SLOW ORDERS" as against the competing routes of No. 6 and No. 30, and since there is double the number of stops on No. 6 and NO. 30 as there are on the 92 Highway, then why are we not justified in stating that there will be 80% LESS WEAR on 92 Highway on the items of stopping and starting?

Again, in paragraph four of Prof. Moyer's letter he stated that on the average curve the WEAR ON TIRES IS DOUBLE what it is on straight sections, so is it not true that if the 92 Highway has an average of 160 LESS CURVES, which is about half of the total curves on either of the two competing highways of No. 6 and No. 30, then one-half the wear of rubber is incident to having this many less curves.

Also, in paragraph five, it is stated that for all GRADES OVER 4% FOR AUTOS AND 2% FOR TRUCKS, that wear on tires is INCREASED 25% for each percent above these grades, and is it not true that with less miles and many straight sections that the 92 Highway would also have an advantage with regard to grades?

ALSO IN paragraph eight, it will be noted that travel around CURVES INCREASES THE USE OF GASOLINE 10%, and is it not true that if the use of gasoline is increased 10% on curves and we have fewer curves, then we have an advantage on this item.

AQUEDUCT

In regard to Item 5 under Division B or "Aqueduct", of course, Mr. Fred D. Pyle, Hydraulic Engineer for the City of San Diego, is far more capable of presenting facts having thoroughly studied this question and arrived at policies, but in talking to him and

others, it seems that the existing plans provide for pumping the water 100 feet from the All-American Canal at El Centro and then forcing the water northerly to a point where it would again be boosted to an elevation of about 2,000 feet and be conducted through a tunnel about 7 to 12 miles in length and then discharged into Capitan Reservoir.

In talking with Mr. M. J. Shelton, General Manager and Chief Engineer of the La Mesa, Lemon Grove and Spring Valley Irrigation District, he stated that San Diego had third priority rights to 112,000 acre feet of water from the All-American Canal and that if this amount of water were brought to the West coast that there would still be 100,000 acres of good land without water. So, the solution of the water problem is quite important and it is believed that no one would know more about it in your community than Mr. Pyle and Mr. Shelton and their advice should be solicited.

INDUSTRIAL DEVELOPMENT

Regarding Item 6 under Division B or "Industrial Development", of course, this is a big subject and it is believed that the existing industrial picture should be analyzed and then the possibilities for increased industrial development noted having a foundation built upon the new conditions with an adequate tunnel. This study for future development, of course, would include the use of information gathered on foreign trade and practically all of the 10 items enumerated in Division B.

Since it would include an analysis of natural resources, location of harbor facilities, terminals, etc., it is believed that some competent person should be placed in charge of this study. There is an engineer at National City, California, who is developing his own industrial business but is very much interested in the construction of the tunnel and he is also interested in the Iron Mountains in Mexico concerning which Mr. Neil Brown also gave me a description. His name is Parks M. Davis; 623 W. 174th Street; National City, California. His Telephone Number is Gurley--7-4281. Of course, Neil Brown in the Spreckels Theater Building; San Diego, California, is also interested in industrial development as well as Mr. M. W. Folsom; 3928 Alameda Drive; San Diego, California. It is believed that these men could develop an outline of procedure being familiar with the local facts.

WATER RESOURCES

Regarding Item 7 under Division B or "Water Resources", of course, this is an extremely important question and would in itself be an important subject upon which to marshal the facts. The U.S. Geological Survey have a great many records regarding the gages of the streams and rainfall and run-off and they have gathered together a great quantity of information for your use. It is also evident that Mr. M. J. Shelton of Le Mesa and Mr. Fred D. Pyle, City Hydraulic Engineer, have gathered considerable information which applies specifically to the San Diego region and they would have first-hand information concerning the capacities, run-off,

etc. in the Cuyamaca Reservoir which feeds the Capitan Reservoir in the head waters of the San Diego River. They would also have figures on the Morena Lake, the Barrett Lake, the lower Otay Reservoir and the upper Otay Reservoir and tributaries and also on the Sweetwater River, and it is believed that they would very much welcome community support in their endeavor to perfect the water system and conserve more water where it seemed best. Some parties indicated a possibility of building reservoirs on the East slope and discharging them through the proposed tunnel. These possibilities, of course, would need to be analyzed by competent persons familiar with the local conditions.

It is also known that during flood periods much water is wasted and there are two theories on water conservation. One is to catch the larger floods in one or several large reservoirs and the other plan is to build a series of small reservoirs on the various tributaries to the streams, and then there is another plan for a combination of these methods. Whether more water could be conserved in the San Diego area by additional reservoir construction would be a question to be determined by the local experts.

RECREATION

In considering Item 8 under Division B or "Recreation", this of course, is a large factor in the San Diego area because it affects all types of business. So, the following is offered from the American Automobile Association.

C O P Y

ATTENTION is therefore directed to the fact that your route, as well as the competing routes, is interested in securing the travel through the particular community that it serves because of the INCREASED BUSINESS IN TRADE that it will acquire whether it be to restaurants, hotels, garages, bridges, or any manner of trade, the same argument is present with ALL OF THE ROUTES.

If you can benefit yourselves as well as to BENEFIT THE TRAVELING PUBLIC, then it is not only to our interest but to the interest of the traveling public to take advantage of the services which we are offering.

IN A STUDY prepared by the American Automobile Association the following division of the reason why people stopped at hotels is given which was in response to a questionnaire sent to hotels throughout the United States. Following is a tabulation:

- 25% came to the hotel because they were recommended by friends.
- 20% because they had been previous guests.
- 12% came because of listing in A.A.A. publications or recommendation of automobile clubs.
- 11% came because of the highway signs used by the hotel.
- 6% came because of the appearance of the hotel.
- 5% came because they had been recommended by other hotels.
- 5% came because they had been recommended by other local citizens (gas station attendants, policemen and others).

- 3% because of the hotel's folder or advertising leaflets.
- 2% because of newspaper advertising.
- 1% because of advertising in magazines.
- 9% because of miscellaneous reasons.

It is pertinent to the development of our highway to call attention to the value of tourist trade to communities, and the tourist's dollar is considered in the following paragraphs.

ACCORDING TO DATA compiled by the American Automobile Association, the largest part of the tourist's dollar, 25 percent, goes to retail stores, largely expended by women for such things as linens, lotions, post cards, beads, baskets, blankets and a variety of other things.

Twenty cents of it goes to transportation costs, including such items as gasoline, garage and accessories purchased enroute.

Twenty-one cents is spent for hotels and other types of accommodation.

Eight cents goes to theaters and places of amusement.

Six cents goes to confectioners.

Other states such as Colorado, Oregon, California, Florida, Michigan and Minnesota have capitalized on the tourist travel and find it to be one of their major industries. The highway department of Wisconsin estimates that the tourist industry brought 134 million dollars into the state last year.

Many people may be attracted to the novelty and experience of traveling through a tunnel of this magnitude and the psychological effect should be studied from a recreation standpoint as well as from industrial and trade area standpoints.

LIQUIDATION, POLICY AND TUNNEL DESIGN

In regard to Item 9 or "Liquidation and Tunnel Design" and Item 10 or "Policy", under Division B, it is believed that discussion on these two items should be combined because they are inter-related. It would seem that procedure to date has been made to a point where the Fact Finding Board is being created and of course, the personnel of this Board is of vital importance to the final culmination of objectives and it may develop that the tunnel project is not the only project to be considered for the general welfare of the Community.

Not being minutely familiar with the personnel, some conclusions about the personnel have been drawn. It is believed that from a general standpoint the Fact Finding Board should not be larger than 10 or 12 members and then each of these 10 or 12 members can head up a division or committee of people competent to aid them in the development of their division. It is believed also that the Fact Finding Board should not be altogether local but that

it should include someone from Long Beach and perhaps intermediate territory between Long Beach and San Diego. It should include someone from the Imperial Valley and someone from National City or Chula Vista and perhaps from Mexico or the peninsula of lower California and then the balance of the members be divided in the area in San Diego and immediate surrounding territory. In listing personnel, agreement regarding those already appointed seems proper.

Mr. Neil Brown seems eminently qualified to handle several phases of the project. Mr. R. S. Stowell; 1401 E. Street seems to have had experience in civic betterment problems and experienced in the distribution problem in his Western parcel service. Mr. Audry Davis was not analyzed but no doubt your judgement and confidence in him is well reposed. Mr. John F. L. Bate, Port Director of the City of San Diego, whose Telephone Number is Maine--0106, of course, is very much interested in the harbor and was one of the original men to prepare articles regarding the development of better outlet to the East. So, he would definitely be eminently qualified to analyze the harbor being an engineer and also a member of the American Society of Civil Engineers.

Mr. Frances H. Gentry of Long Beach and Mr. D. L. Boyer, Assistant Manager of Long Beach and Mr. Furman Castle, City Auditor of Long Beach as well as Mr. Hilman A. Hansen of the Ruscardon Engineers; Central Building; 6th and Main Streets; Los Angeles; Phone--Tucker-4033, are all very much interested in the development of the tunnel, apparently because of a shorter distance but also because traffic must sieve through Los Angeles before it reaches Long Beach and evidently they believe that Long Beach will be a terminal instead of just a secondary location.

There is also a Mr. N. C. Ryan, Assistant Traffic Manager of the Port of San Diego; Harbor Administration Building whose Telephone Number is 0106. He developed and presented the report on traffic at one of the meetings of the Highway Development Association and seems to have considerable information on traffic.

Then the group will need a Secretary and Robert Apitz, Realtor; 1440 Garnet Avenue; Pacific Beach; San Diego 9, California, whose Telephone Number is H-8-2864, seems qualified and interested in this project. Then, there is M. J. Shelton, General Manager and Chief Engineer of the Le Mesa, Lemon Grove and Spring Valley Irrigation District, Le Mesa, California whose Telephone Number is Homeland-6-3251, who has a great many facts regarding water resources and the needs for water. Then, there is also Mr. Fred D. Pyle, Hydraulic Engineer in the Civic Building, who has studied the aqueduct and water supply question very minutely and Mr. M. W. Folsom; 3928 Alameda Drive; whose Telephone Number is Woodcrest--2892. Mr. Folsom has a great volume of accumulated information regarding the entire community development and his viewpoint should be analyzed. There is also Mr. Jensen, Vice President of the Bank of America who is very civic minded.

Then, there is Mr. E. Wallace, District Engineer of the State Highway Commission, Civic Center, who is of course, vitally interested in the Highway outlet to the East and it is believed would

appreciate any community support and cooperation offered him. Then, there is Park M. Davis of National City mentioned above.

Of course, you have many other prominent engineers in your community capable of being placed on the committees and assisting in analyzing your problem. Mr. Carl R. Rankin, who resides at the El Cortez Hotel, of course, would be a very valuable addition. He built the Pennsylvania Turnpike tunnels, the tunnel under Estes Park and many other tunnels as a contractor. He is also a member of the American Society of Civil Engineers. There is also Mr. Richard S. Holmgren, Paul Beerman, J. L. Burkholder and Byrl D. Phelps.

Regarding the "Liquidation", Mr. Hansen's report shows that the total amount of excavation was computed at fifty-eight million tons and he said that there would be a salvage value of about twenty-six million dollars from this material which could be used for the construction of roads, railroad ballasting and for concrete construction of docks, buildings, highways, etc. This salvage was not deducted from his total cost.

Also, a studying of the deltas of the Otay, Sweetwater and San Diego Rivers which in reality form the territory on the West slope of the Laguna Mountains and will be the area for future expansion which would undoubtedly follow the construction of the tunnel, and I think there should be a valuation of this property made from the tax records in order that a percent of increased valuation could be computed over the area of these three deltas which I understand now has a population of about 500,000. In other words, if the present valuation of the property in these three deltas amounted to an estimated gross sum in millions of dollars, then the benefits to property values attributed directly to the construction of the tunnel would form a foundation argument and be a factor in reasoning out the benefits from the construction of the tunnel.

Then, of course, as you know I computed the traffic flow into Southern California from the East which should be checked more minutely and the analysis which I made was based on 100 extra miles around through Los Angeles at six cents per mile. Also, the wear on rubber tires was computed at thirty cents per car for 100 miles. Then, saving of time was computed at two hours saving per car on 5,000 cars per day. Furthermore, there was no figure placed on the value to railroads or the value to trucks, and to the aqueduct. So, we have a combination of benefits to the harbor--increased property valuation--enlargement of trade area--benefits to highways--railroads--aqueduct--saving in vehicle travel--wear on rubber tires--saving in time, and no doubt, other factors can be enumerated and then each one of these factors thoroughly analyzed. We, of course, have merely scratched the surface in gathering together the foundation information for ultimate procedure.

The items of income for liquidation then would be as follows:

Using 5,000 cars per day at 6¢ per mile, total saving on 100 miles, a toll charge of \$2.00 would be justified.

5,000 cars per day at \$2.00 toll would equal \$10,000 per day or per year would equal.....\$3,650,000.00

Addition reason for above would be:

Saving on rubber and tires @ 30¢ per mile on 5,000 cars would equal \$1,500 per day or per year would equal.....\$577,500

Then, if it required two hours to drive the extra 100 miles there would be a saving of 10,000 hours per day on 5,000 cars and there may be several people in each car.

In regard to the saving of 100 miles used above. Mr. Hansen figures 114 miles but it is not known over which route, but the Route 99 and 395 from El Centro to San Diego shows a saving on existing routes of 148 miles.

Cost to railroads, of course, would need to be analyzed. The Rock Island, Illinois Bridge charges 25¢ per passenger to the Rock Island Railroad and the Fort Madison, Iowa bridge, which carries the Santa Fe Railroad, have a joint construction arrangement in which the railroad constructed their portion of the bridge and the highways constructed their portion of the bridge. At Keokuk, Iowa, the bridge is now free having been paid from tolls and an arrangement with the railroad was made to pay a given rate. These facts should be studied and some figure placed upon the possible revenue from one railroad or perhaps from several railroads.

Then the amount of cost to the aqueduct would need to be explored.

There may also be revenue from State and Federal aid and in one area where a Class-4 Airport was constructed and where the division was 25% local, 25% State and 50% Federal, a Metropolitan District was organized covering the benefited area and bonds were issued for local portion of the cost.

It would seem that one of the main safe-guards would be not to short paper the project, that is, if the payment would run over a period of 40 years and it were possible to retire the debt before this period, there should be callable clauses in the bonds in order that the amounts could be paid as revenue increased or decreased. Short time paper over a period of years is not good for those who loan the money nor is it good for those who obligate themselves to pay since short time paper increases the amount to be paid each year and doesn't give the project a chance to get on its feet.

Also, in regard to callable clauses, it is customary to have a premium of from 2 to 5% in case the principal is called earlier than the date of maturity or if at the time of refinancing the paper for lower interest rates, during the periods when money is plentiful which cannot be foreseen by either party, the refinancing may be justified because of cheaper interest rates. Sometimes the premium is reduced as the years progress from 1 to 1/2 % per year. So, the longer the paper would run, the less amount would be charged in premium. Also, some contracts provide that 20% or less can be paid on the principal at any interest paying date during the first 10 years, and then after the first 10 years period or a first period agreed upon, then there would be no premium as the paper was called. Also, it is customary to make the first number of years, say five years, interest paying period in order that the project could gradually get on its feet and then to so divide the principal payments that this would also be flexible, thus making a minimum payment on principal during poor years and a maximum payment during good years. Reserves should also be planned in the original set-up.

Regarding the design, of course, Mr. Hansen's plan provides for a 60-foot bore and his cost includes the concrete linings and division of the tunnel. He has planned three double track railroads on the bottom floor, each to be allotted East or West bound tracks and he has also provided for a six-lane highway on the second floor which also provides for East and West bound traffic. His design and cost, of course, are preliminary as well as his location is preliminary.

There may be other designs such as cutting the tunnel into four quadrants and it may be possible that the railroad section could be placed in the right hand upper and lower quadrant, one for East bound and the other for West bound traffic, and then the highway also placed in the left hand upper and lower quadrants using one likewise for East bound and one for West bound traffic. Then, the aqueduct could be placed in the center and horizontal and verticle webs could be used to divide the quadrants, thus shutting out the noise from one quadrant to the other. But, it is not known how this would work in with the topography at the tunnel portals but this question of design should be carefully studied as well as the location of the tunnel.

It may be possible that the railroads would want to construct and own their portion of the tunnel, using the stone removed for approach construction or elsewhere, and then the aqueduct construct and own its portion of the tunnel and then the highway organization construct and own its portion of the tunnel, using stone removed for approach construction or elsewhere. The highway section could be made free when it was liquidated but the ownership of the railroad section remain in the ownership of the railroads and the aqueduct section remain in the ownership of the aqueduct.

There is also the question of ownership. No doubt the project will belong originally to a corporation and be organized under the State laws and private ownership and public ownership will need to be analyzed as well as the opportune time for initiating the project, and undoubtedly the study of the local, State and Federal laws will be necessary. Just recently the State of Ohio passed a State Act permitting toll roads, like the Pennsylvania Turnpike, to be constructed in Ohio and when the project was liquidated it would belong to the public, which would see the ultimate goal of your project.

There are many other facts and methods of approach to the solution of your problem and I know that you are trying to build a foundation for your procedure and so have been glad to offer ideas within the limit of my experience in organizing projects.

Sincerely yours,

Charles H. Young
Consulting Engineer

Ed Fletcher Papers

1870-1955

MSS.81

Box: 42 Folder: 13

**Business Records - Reports - Young, Charles - "Outline
of Procedure and Pertinent Facts on Fact Finding
Commission or Board to Study a Tunnel through the
Mountains to the East from San Diego, California**



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