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VIETNAM  
RAILWAY  
SYSTEM

● *Submitted by...*

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FEBRUARY 15, 1967

● *Prepared for...*

Transportation Branch  
Engineering Staff  
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AGENCY FOR INTERNATIONAL DEVELOPMENT

## P R E F A C E

For the benefit of the officers receiving informational copies of this report it is suggested reference be made to the following appendages:

- (a) Map showing dates of construction and locations of the various sections of the railroad.
- (b) Map showing Vietnam Railway System south of 17th Parallel.
- (c) Tunnels on the Vietnam Railway System.
- (d) Material required for one kilometer of track and general information on weight, etc.
- (e) Cost of one 12m rail length of track and for one kilometer of track in U. S. \$.
- (f) Typical train "HX57 of 13 T. on axles.
- (g) Obstacle or clearance gauge.
- (h) Motive power and rolling stock.

## THE VIETNAM RAILWAY SYSTEM

(Formerly Trans-Viet-Nam Railway)

### Historical

There is appended to this report a map showing the dates of construction, as well as the locations of various sections, of the railway. This map covers the entire system as it existed both north and south of the 17th parallel at the time of 1954 Geneva Accord.

The following narration will prove helpful in framing an historical picture giving emphasis to the problems confronting the railway officers and personnel.

### I. The Rebirth of the Vietnam Railway System

The history of the railway system of Vietnam, which in many respects is bound up with the history of Vietnam itself, came into existence in the year 1885 with the Saigon-Mytho line, to which was subsequently added, between 1885 and 1902, the Hanoi-Langson line in the North. These were lines of penetration, built above all for military purposes of pacification: French authority had in fact just been installed in Vietnam.

It was only much later that the economic and political advantage of a North-South railroad, linking Hanoi with Saigon (1,730 kms.), was perceived, and the plan to build the Trans-Vietnam, called at that time the "Transindochinois", was included at the same time as a number of other great public works, within the framework of the "Plan Doumer".

The work of construction of the Trans-Vietnam Railway was spread over the years 1903 to 1936.

The last section from Danang to Nhatrang, the most difficult of the whole network, was undertaken long after the 1914-1918 World War. Part of the material and equipment came from German War Reparations, notably in the form of metal girders 50 metres long, which are still well-known in that section by the name of "Krupp" girder.

On October 4th, 1936, the completion of the Trans-Vietnam Railway was celebrated at Kilometre 1221, near the present Hao-Son Station, on the Northern slope of the Col du Varella.

The total length of the track was then 2,185 kilometres.

In the meantime, the railway was progressively put into operation section by section. From 1923 to 1935, before the line linking the North with the South was completed, passenger traffic was in the region of 200,000 passengers over the whole distance, while goods traffic varied between 60,000 and 100,000 tons over the whole distance.

But it was after the completion of the Trans-Vietnam Railway that the increase in traffic was most impressive: both passenger and goods traffic increased considerably, to reach in 1942 the record figures of 570,000 passengers and 240,000 tons over the whole distance, i.e., three times the traffic before the North-South link-up.

Compared with the traffic figures for 1954 of the following foreign system (figures given for passengers and tons over the whole distance):

- India (metric system)	: 786,000	Passengers	+	282,000	tons
- Pakistan (EBR)	: 806,000	"	+	277,000	"
- Burma	: 345,000	"	+	182,000	"
- Philippines	: 402,000	"	+	142,000	"
- Thailand	: 690,000	"	+	203,000	"

the traffic on the Vietnamese Railroad in 1942 held its own very honorably and showed that the railway was of real economic importance.

The situation of the Vietnamese network in South-East Asia, with the prospect of connection with the networks of neighboring countries, gave even more hope of developing the Vietnamese system.

Unfortunately, barely three years after the completion of the Trans-Vietnam Railway, the Second World War broke out, followed by the long guerilla war in Vietnam, which, in fifteen years, was to transform the railroad system into a severely damaged system.

## II. Situation of the Railway in Vietnam during the War

From 1939 to 1954, first the Second World War and then the French War in 1939, Vietnam, like the rest of Indo-China, fell under the occupation of Japanese troops. Military needs raised the demands on transport, while the scarcity of automobile material and motor fuel together with incessant allied bombing, diminished the potential of available transport in Vietnam.

Under these circumstances, the railway remained the only means which could still ensure considerable and regular traffic, and that in spite of the economic blockade of the Allies, which practically cut off all foreign sources of supply of spare parts and fuel. Yet it was in these circumstances that the Railways of Vietnam were able to reach in 1942 the record figures indicated previously.

Could there be better proof of the vitality of the railway as a means of transport?

From 1942 onwards, allied air attacks were intensified, causing in the substructure more and more serious and less and less reparable damage. Entire metal girders were blasted into rivers during air raids, while the essential parts of those left standing were transformed into veritable "sieves" by repeated machine-gun fire.

Between the years 1943 and 1944 the potential of the railway diminished, but still remained appreciable, for during 1944, it was still able to ensure an annual traffic of 300,000 passengers and 86,500 tons over the whole distance, i.e., one-half and one-third respectively of the record figures reached in 1942.

Then on March 9th, 1935, the Japanese Army by a coup de force, abolished the French administration, and set off the Vietnamese insurrectional movement.

At the instigation of the Communists a "scorched earth" policy was systematically applied to the substructure of the railway, which then sustained more extensive and greater destruction than that resulting from all the Allied attacks during the five years of the Second World War.

Lacking explosives with which to blow up bridges, the Vietminh by means of jacks dumped into the rivers a great number of metal girders, having first loaded them with engines and wagons. Where bridges were built on piles, the concrete of the piles was smashed by hammer blows and the metal reinforcement thus stripped, was cut with metal saws.

From March 1945 to January 1946, railway traffic was completely disrupted over the whole territory of Vietnam. It was only during 1946 that the Saigon-Nhatrang-Minhhoa section (450 kilometres), was progressively put back into operation, while it took nearly three years, from October, 1947, to October 1950, before this could be accomplished on the Danang-Hue-Quangtri-Dongha section (171 kilometres).

In North Vietnam, the Hanoi-Haiphong line, property of the Yunnan Company was reopened in 1947, and it remained practically the only working section in the whole of North Vietnam, until 1954.

All the other sections of the track, situated in insecure zones or under Vietminh control, were abandoned.

On the sections which were still in operation, the Vietminh, not content with sabotaging the track and the work, persistently harassed, with machiavelic refinement, convoys and passengers. Whole trainloads of passengers and goods were blown into ravines as a result of the destruction of bridges over which the locomotives were to pass, while other convoys fell into bloody ambushes, causing innumerable victims among civilian passengers.

In all, 194 railwaymen were killed and 972 gravely wounded due to the war, out of a total of 5,500, during the years 1947 to 1954. Today we wish to pay them homage for their selflessness and their boundless devotion to the public cause and to the survival of the railway.

Our review of the situation during the war would be incomplete if we did not point out that during the entire period of hostilities, an immense zone of Vietnam, situated between Nhatrang and Danang was completely under Vietminh control. This zone, comprising the provinces of Quangnam, Quangngai, Binhdin and Phuyen formed what the Vietminh called their "5th Military Region". Themselves obliged to ensure minimum traffic for their civil and military needs, and in the state of total blockade which made all road traffic impossible, the Vietminh must have bitterly regretted their "scorched earth" policy which had destroyed the vitals of the substructure and of the railway equipment in that area. They sought to remedy the situation, but in spite of their efforts to repair what had been destroyed or to reconstruct the demolished material the results were pitiable.

The rolling stock, especially that which consisted of a wooden floor covered with a thatch roof, all placed on old carriage axles without any spring or shock absorber, took us back two centuries, to the heroic era of the invention of the railway, while their method of working it, which consisted, along certain sections, in loaded coaches being pushed by men thus transformed into veritable beasts of burden revolts us now, but didn't seem to move the Communist regime.

This situation lasted until May 1955, when under the "regroupment" clauses of the Geneva Agreement, the National Government re-occupied all of the "5th Military Region".

Seriously short of means, the Railway Administration has once again taken charge of the track and the delapidated rolling stock given back by the Vietminh, and has been making every effort for two years to put into operation this rudimentary railway, whose stoppage would have suffocated the provinces which had just been re-occupied.

### III. The State of the Railways of Viet Nam at the end of hostilities

The Geneva Agreement, in partitioning Vietnam, theoretically, left south of the 17th parallel 1,406 kilometres of the former network of Vietnam.

Of these, 1,406 kilometres, only 908 kilometres of terribly ravaged tracks, furthermore divided into two and separated by an enormous gap of 498 kilometres, remained in operation:

- the network of Central Vietnam, comprising the Danang-Dongha line: 171 kilometres.
- the network of South Vietnam, comprising the section Ninhhoa-Saigon of the former Trans-Vietnam Railway and a certain number of branch lines, totalling 737 kilometres.

Of the 908 kilometres still in operation at the time of the cease-fire, the still unrepaired war damage could be estimated at not less than 150 million piastres at the end of 1954.

But the heaviest damage was suffered on the 498 kilometres run in the former Vietminh zone from Ninhhoa to Danang.

In fact, on this run:

- 198 kilometres of track had been completely uprooted and the roadbed destroyed;
- 300 kilometres of weakened track still existed in small sections.
- 20 metal girders of 50 metres had become unusable and had to be replaced by new material;
- 75 metal girders of 50 metres were badly damaged but re-usable;
- 68 bridges in re-inforced concrete, of a total length of 2,300 metres had to be entirely rebuilt;

The stations, depots, workshops and staff houses, almost without exception, were razed to their foundations.

As for the locomotives and rolling stock, the war took an equally heavy toll. In 1939, before the Second World War, the railways had stock composed of:

- 173 steam locomotives with a total of approximately 96,000 H.P.
- 412 passenger coaches of all classes;
- 2,372 units of 10 tons of goods wagons.

It can be said that after the events of 1945 at least two-thirds of the stock was destroyed. In spite of intensive renewals carried out between 1947 and 1954 the Railway Administration of Vietnam found itself with a stock which, at the end of hostilities, consisted of more than:

- 114 steam locomotives;
- 138 passenger coaches of all classes;
- 1,702 units of 10 ton of goods wagons.

Whether it be old or new, all this equipment has suffered very heavily from years of intensive usage and from the sabotage of the years 1946 to 1954.

As for the railway personnel, of a figure of 13,000 railwaymen at the height of development in 1942, no more than about 5,500 remained.

#### IV. Work of reconstruction and programme for extension

Immediately after the end of hostilities, the Vietnamese Railway Administration made a concentrated effort on the problems of reconstruction.

The volume of work to be done seemed impressive. A rapid estimation made in 1954, showed that no less than 700 million piastres were needed to restore the track and buildings to their pre-war state.

Fortunately, it was subsequently realized that certain damage was less severe than had been thought; for instance, in the case of metal girders blown into the rivers, it was found that with a little ingenuity they could be picked up and put upright again.

Another favorable factor, which greatly contributed to the easing of the work, was the former standardization of the large metal girders, which permitted the reconstruction from pieces retrieved from several bridges, of a bridge of the same type.

Hidden material was discovered and made use of again. Thanks to the economies realized owing to these finds, it was possible to reduce the cost of the first phase of the work to 300 million piastres. This was to lead to the complete re-establishment of the Saigon-Dongha line, with its terminus at 21 kilometres from the 17th parallel.

The financing of this first phase came from a Government loan of 130 million piastres for local expenses, and a grant of 4,360,000 U. S. \$ from American Aid, which was used for the purchase of trackwork, metal bridges, cement, steel bars for concrete, etc.

After the link-up, work on the improvement of the track will be continued, which will enable trains to reach pre-war speed again. Simultaneously with improvements carried out on the existing lines, the Railway Administration is now studying a project for the construction of a new line connecting the coal mine of Nongson to the main line near Chiemson Station, south of Danang. Work began September 1959, and has been planned so that the inauguration of this 32-km-long branch line would take place in May 1961; this was expected to permit the passage to Saigon of 100,000 tons per year, which should increase to 150,000 tons per year.

Among the important modernizing projects envisaged for the next ten years, we should like to draw attention to the plan for the electrification of the Tourcham-Dalat line in connection with the Danhim Dam project at Dran, which is intended to increase the volume of transport and to cut down the running costs on this line which includes a long section of rack-railway.

The track gauge, which is now 1 metre as on most railways in South East Asia, still leaves a considerable margin in the capacity for transport. It is estimated that it is not necessary to anticipate its widening to the normal gauge of European or American railways (1 metre 435) before several decades, unless a general plan for the widening of gauges is considered for the whole South East Asian area and unless it is justified by an increase in traffic through the borders between the countries of the region.

#### V. Renewal and Modernization of Rolling Stock

If the reconstruction of the line did not involve important changes in the conception of the substructure, on the other hand, the renewal of rolling stock will lead to radical changes made necessary by the evolution of railway technique in the last twenty years. This modernization is essentially aimed at reducing operating costs and rendering railway transport competitive with other means of transport in a Vietnamese economy which is, in principle liberal.

This evolution of rolling stock technique has been made urgent and indispensable by the fact of the partition of Vietnam, which has caused the loss to the National Government of the coal mine of Hongay, now on the other side of the "Iron Curtain". The coal from the Nongson mine, which is rather anthracitous, does not lend itself to the stoking of steam-engines and had better be reserved for the stoking of stationary generators, such as steam plants.

Under these circumstances the Railway Administration of Vietnam has decided to proceed as soon as possible to the complete Dieselization of its locomotives and to the renewal of an important part of its rolling stock. This programme consists in acquiring:

- 54 electric Diesel locomotives of from 850/950 H.P.
- various goods wagons of from 25 to 30 tons capacity.

As first instalment of this programme, the Railway Administration of Vietnam, in December 1958, received from French Technical and Economic Aid, six electric-Diesel 850 H.P. Alsthom locomotives. From the U. S. In loans and grants-in-aid 48 General Electric Diesels 850/950 H.P. have been received in 1963 and 1965.

The introduction of Diesel tractor material will therefore not only make possible a reduction of more than 30% in the cost of traction, but will also increase the average speed of trains thanks to the abolition of refueling, and to the growth of general comfort of passengers, thanks to the absence of coal fumes, especially on the routes in Central Vietnam where there exists numerous tunnels.

#### VI. Importance of the Railway in the Development of Viet Nam

The completion of the reconstruction of the railway south of the 17th parallel, is exceptionally important from all points of view. In fact;

1. From the economic point of view, it will make possible a North-South link-up of all the coastal area of Vietnam south of the 17th parallel, which will be served by a heavy transport line.

With pacification, in addition to local trains, a daily service of passenger trains will run direct from Saigon to Hue and vice-versa.

Connection with Dong -Ha will be made by a local train, departing Hue.

The distance Saigon-Hue (1,041 Kms.) will be covered by the through train in 26 hours.

But the transport capacity of the rebuilt Trans-Vietnam Railway is much greater than that mentioned above, which only reflects the present needs of Vietnam. This capacity even leaves a comfortable margin for future development, without fear of premature saturation. In fact, taking as a basis the

present level of transport, and taking into account the growth of traffic which the North-South link-up without change of trains will bring, and again taking into account new ideas in the plan for the economic development of Vietnam (such as the opening of the Nongson coal mine, the chemical fertilizer factory in the Danang region, the construction in the near future of a cement factory in the Long tho region near Hue, etc.), it would not be unreasonable to estimate future traffic on the railways of Vietnam at about:

- 400,000 passengers over the whole distance, i.e., over the 1,200 kilometres of the rebuilt track, a figure of 480,000,000 passengers per kilometres per year.

- 220,000 tons over the whole distance, i.e., one the same total distance of 1,200 kilometres, 264,000,000 tons per kilometre per year.

The railway system of Vietnam as at present conceived can even be expected, within the next ten years, to be able, in case of need, to ensure traffic at figures at least double those mentioned above, without any need for important alterations.

It would be difficult to imagine how such heavy traffic could be undertaken by any means of transport other than the railway, without enormous expenditure for the enlargement and reinforcement of substructures, and without running into much heavier expenditure of foreign currency to finance the purchase of material, fuel oil and spare parts which for a long time to come will have to be imported entirely from abroad.

From the strategic point of view; the experience gained from the Second World War and the long guerilla war which followed has shown that the Railway constitutes a not negligible strategic element, thanks to its excellent organization, the discipline observed by its workers, the regularity with which it functioned in the past in spite of sabotage and destruction, but above all to its remarkable ability to take on, practically without preparation, sudden and considerable increases in the volume of transport.

Some people are of the opinion that the above-mentioned advantages of the railway are only valid in a guerilla war, and that the efficiency of the railway in any future conflict where "conventional arms" would be replaced by thermo-nuclear weapons remains to be seen. Obviously, the efficacy of a means of transport can be only relative. It is in comparison with other means of transport, road, river, sea and air that the efficacy of the railway must be viewed. If the railway ever ceased to function because of the thermo-nuclear menace, other means of transport would probably be compelled to do the same, and long before the Railway.

From the political point of view, a democratic , independent and strong Vietnam cannot do without means of mass transportation, and in the present technical and economic state of Vietnam, it is difficult to conceive of any means other than the railway.

This fairly obvious truth bears repetition.

The Trans-Vietnam Railway, which has been rightly considered the backbone of Vietnam, linking the Northern frontier with the banks of the Mekong had effectively brought together regions which formerly lived practically isolated from one another, because until 1936, they had no practical and effective means of communication.

Still more recently, the re-occupation of the four provinces of Quangnam, Quangnai, Binhdin and Phuyen after the "regrouping" operations of 1955, revealed the necessity for rapid means of communication between these provinces and the rest of Vietnam, by the reconstruction of the Trans-Vietnam Railway, if the political and economic integration of this region, which for a long time remained apart under Vietminh occupation, is to be achieved.

These last five years have been for Vietnam a necessary period of preparation and mobilization of resources, which some have interpreted as stagnation.

Nothing could be farther from the truth.

Now that the first results are becoming apparent, it is realized that this long period of preparation has not been wasted in inactivity.

We hope that with gathering momentum in the process of economic development, it will soon become evident that following the Railway will come the Danhim Dam, the Nongson Mine, the urea and chemical fertilizer factory, the cement works of Hatien and Longtho, etc., and that the completion of the railway will open up a new era of economic expansion which will be the main weapon of the Republic of Vietnam in its fight for independence and freedom.

NOTE:

Credit for the foregoing goes to Tran-Le-Quang, former Minister of Public Works and Communication and President of the Council of Administration of the Vietnam Railway System, and now Regional Advisor, United Nations Economic and Social Office in Beirut.

# REPUBLIC OF VIETNAM

MAP SHOWING

## VIETNAM RAILWAY SYSTEM

AS OF Jan. 1, 1967

### MAIN LINE

SAIGON TO DONGHA 1,109 Km

### SPUR LINES

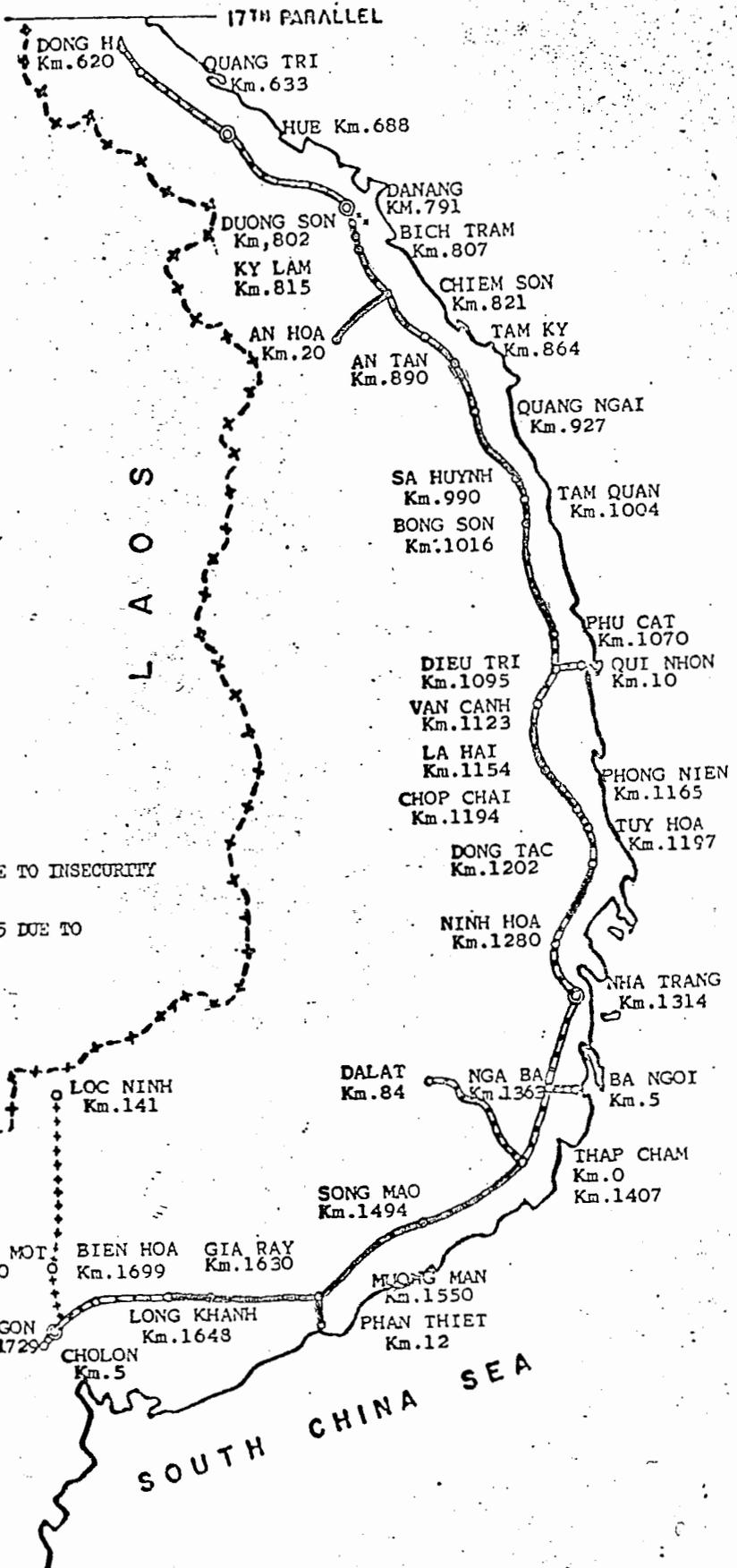
BIEN HOA TO LOC NINH 117 Km  
 THAP CHAM TO DALAT 84 Km  
 MUONG MAN TO PHAN THIET 12 Km  
 DIEU TRI TO QUI NHON 10 Km  
 NGA BA TO BA NGOI 5 Km  
 BA REN TO AN HOA 20 Km

**TOTAL 1,357 Km**

STEEL BRIDGES OVER 2CM 112  
 CONCRETE BRIDGES OVER 1CM 221  
 TUNNELS 27

### LEGEND

- ++++ NOT USED SINCE 1961
- OPERATIONAL
- TEMPORARILY DISCONTINUED DUE TO INSECURITY
- UNDER REPAIR
- DISCONTINUED SINCE FEB. 1965 DUE TO FLOOD DAMAGE AND INSECURITY
- RAILROAD STATION
- - - - INTERNATIONAL BORDER



PHU QUOC

THE ROLE OF THE VIETNAM RAILWAY SYSTEM  
IN THE PRESENT AND FUTURE ECONOMY

Previous pages have set forth a comprehensive history of the railroad, the situation during the war, the state of the railroad at the end of hostilities, the renewal and modernization of rolling stock and motive power and we have dwelt on the importance of the railway in the development of the country.

In the appendages you will find up to date maps or drawings depicting the area traversed by the rail lines, construction dates of the various sectors, tunnels, motive power and rolling stock and other important details of this meter gauge railroad which was built by the French.

While in Saigon (December 10 to January 19, 1967) it became necessary to respond to a request from the MACV Transportation people to USAID Public Works Department for a forecast of the role which the VRS would play in the present as well as the future economy of the country. In cooperation with Mr. Lee Marsden, Railroad Advisor, Public Works USAID the following facts were assembled which gives the most recent evaluation of the economic study supported by general observations as found expedient.

The data as set forth in the body of this report is not just an opinion but a recap of data taken from a number of highly capable consulting firms as well as valued information from knowledgeable individuals who are well versed on the overall transportation problems of South Vietnam.

Information and data for this report has been compiled from studies made by the following consulting firms and individuals:

1. Transportation Consultants, Inc.  
Washington, D. C.
2. Day and Zimmerman, Inc.  
Philadelphia, Pa.

3. Special Military Commission  
Chaired by Mr. L.V. Anderson  
General-Manager of Milwaukee Railroad.
4. Mr. L.C. Reynolds, USAID Transportation  
Consultant, former Superintendent of  
Transportation for the Chicago and North-  
Western Railroad (7 years of experience  
in Vietnam as Railroad Advisor for USAID).
5. Mr. Pham Minh Duong, former President of the  
Vietnam Railway System.
6. Mr. Nguyen Ngoc Lam, Director of the  
Vietnam Railway System.
7. Mr. Nguyen Quang Dat, Chief of Executive  
Department, Vietnam Railway System.
8. Mr. Tran Le Quang, Former Secretary of State  
for Public Works and Communications and President  
of the Council of Administration of the Vietnam  
Railway System. (Now Regional Advisor, United  
Nations Economic and Social Office in Beirut).

#### The Vietnam Railway System in General

In order to visualize the role in which the railway will and can participate in the overall economy of South Vietnam, one must be familiar with its fixed property, rolling stock, shop facilities and dedicated personnel.

This information is available from the foresaid transportation studies, but I will emphasize the fact that the VRS is an exceptionally well engineered railway with 413 bridges 10 to 50 meters long or longer constructed from steel and concrete, which are located in vertical profile well above the waterways.

The 27 tunnels are well designed, large in vertical and horizontal clearance, well drained and easily maintained.

The 1100 kilometer of track from Saigon to Dong Ha has relatively heavy rail, (30 kilogram/meter) steel ties and the controlling grades are less than 1 1/2 percent. With only a few exceptions the vertical and

horizontal profile of the track is suitable for speeds far greater than that at which they are presently operating.

The modern motive power and rolling stock consists of 55 Diesel Electric Locomotives and over 700 four axle freight cars, of which a large percentage are roller bearing equipped. This is not to mention the 50 serviceable steam locomotives and some 300 two axle freight cars.

The on line shop facilities of the VRS are adequate to handle all types of minor repairs to motive power and cars. The newly equipped diesel electric locomotive shop and car repairs. These shops are well supervised and have a highly trained technical staff.

The personnel of the VRS is a very dedicated group of employees. From 1947 to 1954 (when Geneva Agreement took affect), 195 railway employees were killed and 972 injured. From 1961 to date 78 employees have been killed and 750 injured. Regardless of this casualty rate and with only a minimum of security these people have continued to operate this railroad, and at no time has the operational mileage dropped below 26 percent.

#### Traffic Forecast.

To project an estimate of the traffic potential for the VRS one year after the main line and present branch lines have been restored to operation, it was concluded that a basic year should be selected from which projections may reasonably be made. The year 1961 has been selected as a basis for this forecast. The 1961 figures were taken from the VRS records by the consulting firm, Transportation Consultants, Inc., and published in their August 15, 1966 report, "Vietnam Transportation Study". These figures and the forecast figures are as follows:

<u>Year</u>	<u>Total Freight Tonnage</u>	<u>Total Ton/ Kilometers</u>	<u>Total Passenger Traffic</u>	<u>Total Passenger Kilometer</u>
1961	439,700(MT)	166,845,900	2,580,600	583,120,700
Projected) Increase) 40% one ) Year after) Reconstruction)	615,580	233,584,260	3,612,840	816,368,900

Net Increase 164,660 meter tons.

Justification of a 40% increase can easily be supported by a number of commodities. The Non-Sen Coal mine was just developing in 1961 when the Ministry of Public Works authorized the purchase of 93 Hopper Cars to handle an estimated 150,000 tons of coal from this mine to locations north and south of Ba Ren. The An Hoa complex consisting of 19 separate processing plants have 30,000 tons of machinery and equipment stored in the Saigon area awaiting rail transportation and security of the An Hoa area. The railroad no doubt will move a large portion of the raw materials to these plants as well as the finished products originating from production.

There is good reasons to believe that products from Laos will move to Dong Ha and be moved by rail to Da Nang for export.

The Da Nang area has rich forest lands that will develop industrially and move by rail to Da Nang for export or south to Saigon for local markets.

Sugar Cane is grown extensively in many areas and can be moved by rail to the Quang Ngai sugar mills. Tuy Hoa has extensive plans to construct a sugar refining mill which was developed by the Chinese from Taipei.

Tam Quan and Bong Sen have large groves of coconuts from which coconut oil and dried coconut can be moved by rail to local markets and export points.

The area in the vicinity of Van Canh and La Hai raise large crops of corn and soy bean and rail movement of such commodities has proven in the past to be the most economical.

Cattle and oxen are raised in large numbers in the area between Nha Trang and Thap Cham. With an operational railroad these animals could be moved in car load lots to the Saigon market to meet the demands of this rapidly growing metropolis.

The Dalat area produces an abundance of vegetables and with refrigerated cars these vegetables could be readily marketed all the way from Saigon to Dong Ha. The Dalat area also raises coffee and tea for export as well as timber products from Krong Pha.

Phan Thiet produces and exports the largest quantities of fish sauce or Nuoc Man in Vietnam. The operation of this industry has been curtailed by the loss of the rail system.

The Gia Ray and surrounding area including Xuan Loc and Trang Bom are heavily forested and a considerable amount of timber was moved from these areas by rail to the Saw Mills at Bien Hoa, Thu Duc and Saigon.

Another industry, which is now in the Saigons industrial complex, is that of the steel mill and foundry.

To operate a steel mill, scrap iron of select classification must be provided to make the end product. Much suitable scrap iron can be obtained north of Saigon. The movement of such material can only be accomplished economically by rail. The railroad alone has approximately 15,000 tons of scrap and it is estimated that another 75,000 tons is available from other market sources if adequate transportation is available to move it to the market or export areas.

It must also be remembered that Saigon has the largest industrial complex of any city in Vietnam. If this industrial growth is to continue, it is of the utmost importance that they have a fast, dependable and economical means of transporting their commodities from Saigon north.

Little has been said of the passenger traffic potential. With the increase of a concentrated population in the cities and towns along the VRS, need for regular and safe transportation is of paramount importance. The livelihood of thousands of small farmers depends on the transporting of his vegetables, pigs and ducks to market. Travel by train and transport of their products by train to market and return with rice and clothing is very essential to these people. Recognizing the need for 3rd class passenger equipment with which to carry the ever increasing number of passengers, the Australians, under the Colombo Plan, provided the VRS with 10 new coaches in 1963. The cost of this equipment was \$900,000. This expenditure was authorized only because of the economic need to provide transportation to the masses and stimulate trade within the provinces.

Under the date of July 10, 1958 an independent survey was made of the Vietnam Railway System, under contract P10/T 30-23-171-3-70283, by Day & Zimmerman, Inc. Pages 178 to 180 inclusive, reflect their conclusions and recommendations, which are to the effect and we quote, "In view of the inadequate highways and unreliable coast shipping, it is our opinion that the restoration of the two inoperative sections of the railroad is of the utmost importance to provide, at an early date, a north-south mass transportation system for passengers, freight and military traffic". This quote/statement was true in 1958 and it is doubly applicable today. We shall also refer to a second and more recent independent survey made by Transportation Consultants, Inc. and submitted August 15, 1966. In this report, page 151, the following recommendations is made, and we quote, "Prompt provisions should be made to make emergency repairs to the railway system as soon as wherever the property can be made safe for repairs crews and equipment to work, and for the railroad to operate, at an estimated cost of 3,900,000 US\$ in foreign exchange plus 104,500,000 VN\$ for local labor and materials; this work to be followed by permanent rehabilitation estimated at an additional cost of 9,000,000 US\$ and 300,000,000 VN\$".

In addition to the two foregoing firms recommendations that the railroad be rehabilitated and restored to servicing the north-south Saigon to Dong Ha economy, we have information that a Special Military Commission, composed of four reserve officers and headed by Mr. L.V. Anderson, General Manager of the Milwaukee Road made a study of the VRS. In a joint recommendation to the D.O.D. they advocated the restoration of the railroad and commended the facilities and equipment provided by the U.S. Government through DLF Loan 129 and through the Agency for International Development, Grants-in-aid.

In this report it was asked to endeavor to justify the reconstruction of the railroad between various isolated points from strictly an economic standpoint. There is no doubt that much would be gained at some locations and little at others. Locomotives and cars could not be made available to isolated locations to meet supply demands, repairs would be a constant problem and movement of heavy and bulky parts for cars and locomotives can only be justified by rail. The reconstruction of the railway by sections will contribute much to the communities through which it passes, but the full economic impact will not be felt until the railroad is operational from its largest Industrial City, "Saigon" to its most northern City "Dong Ha".

In conclusion it is desired that a memorandum be attached to this report which reflects the thinking of Pham Minh Duong, former President of the Vietnam Railway System, when questioned in February 1965 as to the temporary suspension of railroad operations.

MEMO

President Pham Minh Duong - VRS

The issue at hand is whether railroad operations ought not to be temporarily suspended in view of heavy losses in life and property caused by Vietcong attacks. The main factors in favor of temporary suspension are:

1. The Railroad must be subsidized in order to continue operating and these subsidies - now amounting to over one hundred million piasters per year and possibly more in the future are a real financial burden on the national budget.
2. Over one thousand men of the Armed Forces are now assigned the responsibility of protecting train operations. This could be viewed as a diversion of scarce fighting manpower from other combat duties.
3. Destruction of or damages to locomotives, rolling stock, and related facilities are a net loss for the economy. Scarce resources either national or contributed by friendly Nations - have to be spent in the replacement of equipment destroyed by the enemy.

Loss of life is not counted as a factor because it is not solely and inherently attributable to railroad activities.

On the other hand, there are many factors which work against the idea of suspending train operations. First, it would be very difficult, if not impossible to replace the Railroad as a carrier of bulk freight over long distances. Both cost wise and technologically, no other carrier can perform as well as the Railroad in carrying rice, heavy machinery and equipment, petroleum products not to mention military supplies etc., from Saigon to Nhatrang and points farther North. One proof of this can be found in the current price rise of rice and other commodities in the Danang area subsequent to mid-September interruption of through train service. As Vietnam becomes more industrialized and manufacturing plants spring up in the DaNang/Nong Son area the Railroad's superiority as a long-distance volume carrier will become even more evident.

Secondly, should the Railroad close down, its fifty-five hundred employees would lose their jobs and the effects of this sudden and massive unemployment would be incalculable.

Besides the twenty-two million plus in salaries and wages that will be lost to the economy, there are also the thousand and one purchases that the Railroad makes each month, purchases that mean approximately ten million piasters to dealers and merchants selling petroleum products, spare parts, hardware, paint, paper, and thousands of other items required by the RR. Via the multiplier effect, the loss to the economy of nearly thirty-five million piasters in Railroad expenditures will have as serious as the sudden withdrawal of a sum several times larger from the economic circuit.

Thirdly, and related to point No. 2, the unemployment of fifty-five hundred persons - the majority of whom can be safely presumed to be the only income earners in the family - represents an economic catastrophe for that many households, i.e. for roughly fifty thousand people.

In view of the present political and social conditions, the question naturally arises as whether the nation can afford such social upheaval just at this time.

Fourthly, the Railroad at present owns and operates motive power, rolling stocks, rail and other track structures which represent a multi-billion piaster investment. Since most of this equipment is highly specialized, suspension of service necessarily means letting this valuable capital lie idle and the resulting waste would cost the national economy more than the budgetary subsidies.

Last but certainly not least, there is the politico-psychological factor. In Vietnam as everywhere else, railroads have come to be associated with order and stability, with peace and progress.

Up until now, trains have been kept running in spite of the enemy's efforts to stop them and this represents a continuing and important victory for our side. Should we now decide to discontinue - however temporarily - train service, such decision would unavoidably be interpreted as a serious defeat and the first sign of a general withdrawal and abandonment. The will to fight would be dealt a fatal blow and the war effort seriously hurt.

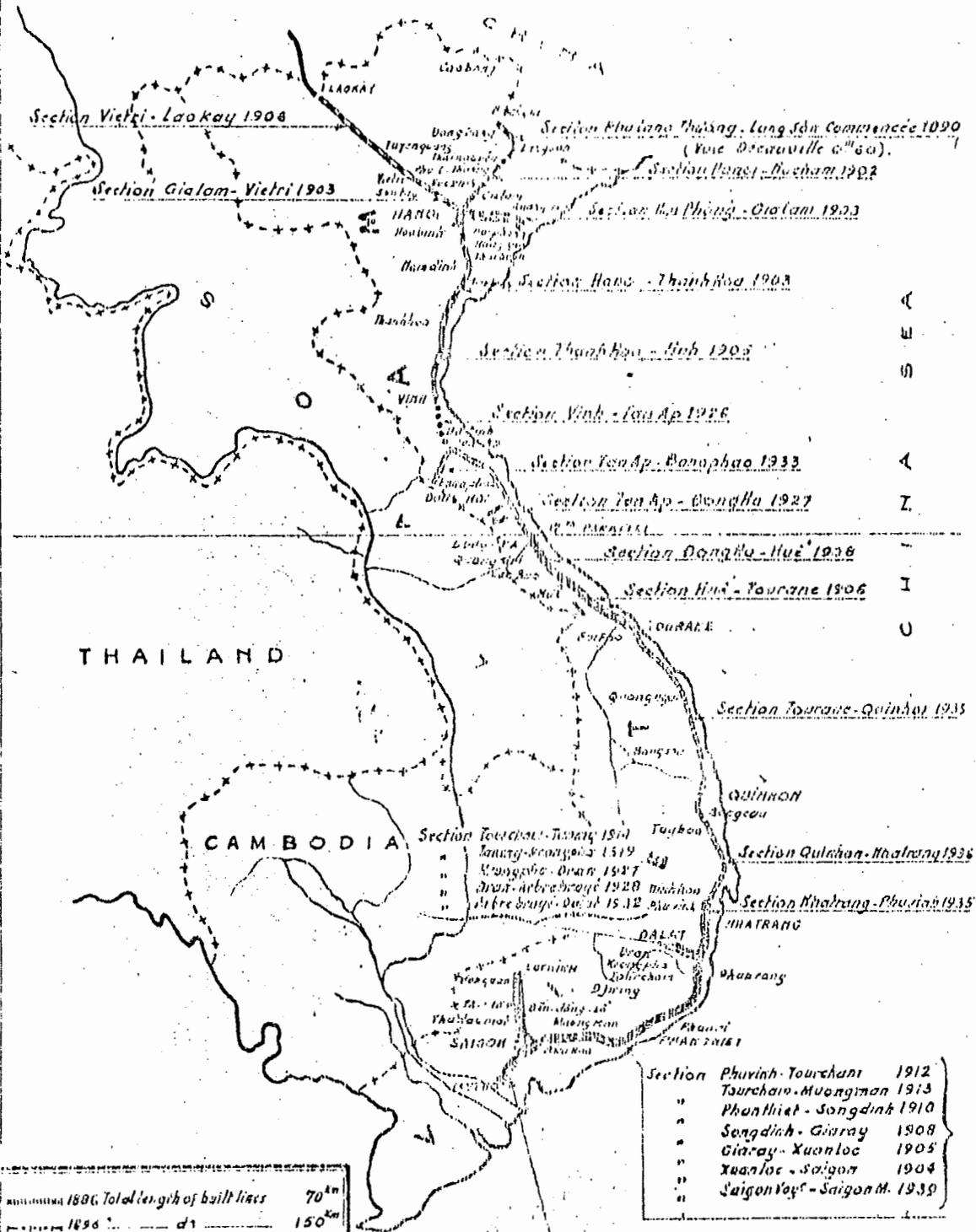
When all the pros and cons have been stated and evaluated, there should be no doubt whatever that every assistance and aid possible and available should be given to the Railroad to keep it operating through the present difficult phase.

Pham Minh Duong

# RAILWAY OF VIETNAM

MAP SHOWING THE DATES OF CONSTRUCTION  
AND LOCATIONS OF THE VARIOUS SECTIONS OF LINE

(a)



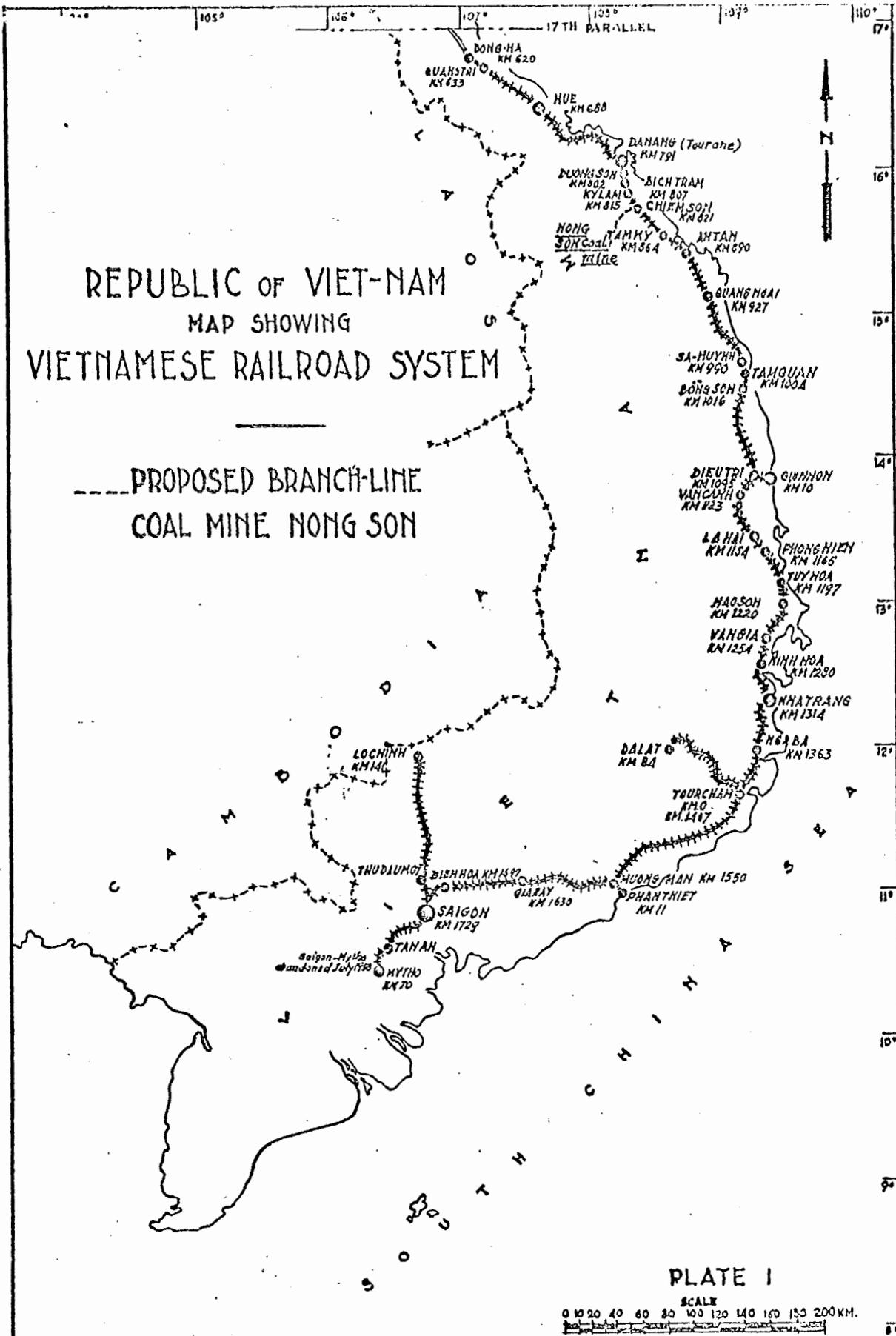
1890	Total length of built lines	70 km
1896	d <sup>1</sup>	150 km
1906	d <sup>2</sup>	1662 km
1910	d <sup>3</sup>	2675 km
1928	d <sup>4</sup>	3206 km
1935	d <sup>5</sup>	3467 km

- Section Vinh - Tourane 1912
- Tourane - Muong Man 1913
- Phan Thiet - Song Dinh 1910
- Song Dinh - Garray 1908
- Garray - Xuan Loc 1905
- Xuan Loc - Saigon 1904
- Saigon Vay - Saigon M. 1939

Published by the V.V.C. Company in 1912

V.V.C. 9085

16



L.C. REYNOLDS  
RAILROAD ADVISOR

PLATE I

11  
(c)

TUNNELS ON THE VIETNAM RAILWAY SYSTEM

Name	Tunnell Location	Length In Meters	Characteristics	
<u>DONGHA-SAIGON</u> (17th Parallel)				
	Mui-Ne	725+100	221 m	Curve R = 350 m
	Cau-Hai	732+900	358 m	" R = 350 m
	Phu-Gia	746+000	445 m	Alignment
Col des nuages	(Lang-Co	757+250	170 m	Curve R = 100 m
	(Khe-Sai	757+750	124 m	" R = 150 m
	(Porte de Hue	762+450	129 m	" R = 100 m
	(Petit Col des Nuages	766+000	564 m	Aligt. & Curve R = 100 m
	(Nam-Chan	770+700	322 m	" " " R = 100 m
	(Lien-Chieu	774+800	944 m	" " " R = 100 m
		Binh-De	998+000	273 m
	Phu-Cu	1027+000	170 m	" " " R = 300 m
	Chi-Thanh (Babonneau)	1168+700	325 m	Curve R = 800 m
		1225+000	1190 m	Aligt. & Curve R = 400 m
Col Varella	(Vung Ro No. 4	1227+000	368 m	Curve R = 500 m
	(Vung Ro No. 3	1228+100	163 m	" R = 700 m
	(Vung Ro No. 2	1228+300	248 m	" R = 500 m
	(Vung Ro No. 1	1229+200	60 m	" R = 500 m
	Bai-Gia	1231+100	393 m	Alignment
	Coi Ma	1234+400	403 m	"
	Rotuong	1290+250	220 m	"
	Ru Ry	1306+700	516 m	Aligt. & Curve R = 500 m
Song Cai	1310+900	71 m	Aligt. & Curve R = 400 m	
TOTAL LENGTH		7677 m		

TOURCHAM-DALAT

No. 1	43+350	164 m	Curve R = 300 m
No. 2	49+400	70 m	" R = 100 m
No. 3	63+000	629 m	Aligt. & Curve R = 150 m
No. 4	68+100	98 m	Curve R = 150 m
No. 5	70+150	129 m	Aligt. & Curve R = 200 m

TOTAL LENGTH 1090  
GENERAL TOTAL LENGTH - All  
Tunnels 8767 = 1

SAIGON, 17 April 1964  
Office Chief Engineer  
Vietnam Railway System

(d)

MATERIAL REQUIREMENT FOR ONE KILOMETER OF TRACK

Rails	168 nos
Steel ties	1,428 -
Angle-bars 168x2	236 -
Bolts, angle-bars	672 -
Clips A	2,856 -
Clip C	2,856 -
Bolts, clip	5,712 -
Washers	6,304 -

GENERAL INFORMATION

Weight of one rail	360 Kg.
Weight of one Km of track, rails only	60,500 Kg.
1,000T of rails can cover	16 Kms of track
Weight of one tie	45 Kg.
Weight of one Km of track, ties only	64,260 Kg.
1,500T of ties can cover	23 Kms of tracks
Number of ties per 12m rail length	17 ties
Number of ties per Kilometer of track	1,428 ties

## COST OF ONE 12m RAIL LENGTH OF TRACK

-\*-

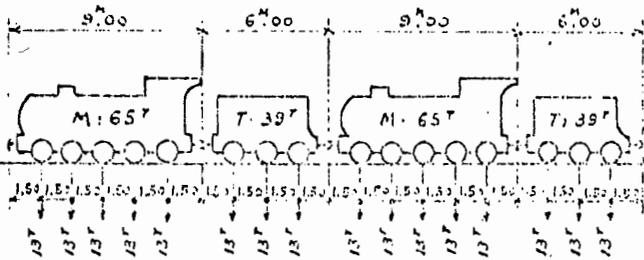
2 rails	US\$ 72 x 2	=	144
17 ties	14 x 17	=	238
34 clips (A)	0.57 x 34	=	18.5
34 clips (C)	0.59 x 34	=	20
68 bolts (clip)	0.28 x 68	=	20
68 washers (clip)	0.021 x 68	=	1.5
4 fish plates	2.20 x 4	=	9
8 bolts (fish plates)	0.29 x 8	=	2.5
8 washers (fish plates)	0.021 x 8	=	<u>0.2</u>
			453.70

## COST FOR ONE KILOMETER OF TRACK

$$\text{US\$ } 453.00 \times 84 = 22,052$$

# TYPICAL TRAIN "MX 57" OF 13 T ON AXLES

(1/4)



Load uniformly distributed  
 Maximum value : 4 T per lineal meter  
 Minimum value : 1 T "

Note : all meas. in Meters.

TRAIN OF : Two 65 T Locomotives of five 13 T axles, two 39 T tenders of 13 T axles and a suite of wagons assimilated to a load uniformly distributed from 4 T/m maximum to 1 T/m minimum.

## LOCOMOTIVES CHARACTERISTICS

## VALUES

Overall bumper length	9 <sup>M</sup> 00
Number of axles	5
Distance between axles	1 <sup>M</sup> 50
Distance from the bumper to the nearest axle	1 <sup>M</sup> 50
Load per axle	13 T
Total Load per locomotive	65 T

## ATTACHMENT VISA

The Chief of  
 Operation  
 Saigon 19 July 1957

The Chief of  
 Material and Traction  
 service.  
 Saigon 17-7. 1957

Drawn by :

The Chief of Track, Building  
 and Reconstruction division  
 Saigon, 12.7. 57

NGUYỄN. Đ. ĐẠT

VĂN. ĐÌNH. YẾN

NGUYỄN. BÌNH. QUẾ

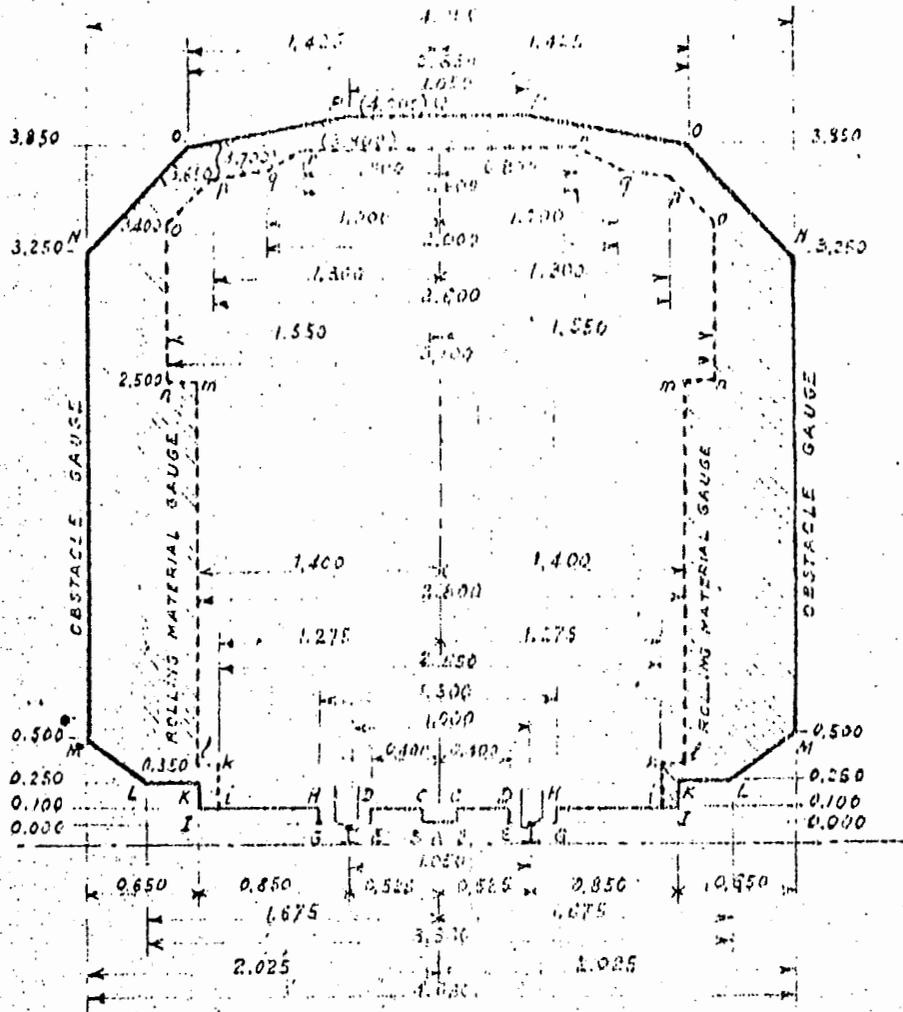
Examined and approved  
 Saigon, 2.8. 57  
 The Manager of the Regie

Approved:  
 Saigon, 22.8. 57  
 The Minister of Public Works  
 and Communications

NGUYỄN. HUỖC. LÂM

TRẦN. LÊ. QUANG

YB.C...T 0717



Note: all mens in Meters

# OBSTACLE GAUGE AND ROLLING MATERIAL GAUGE ( SERVICE ORDER No 56 - 1956 )

SCALES 1/40 THE CHIEF OF VET SUBDIVISION  LE CAC BA		DATE: 21.7.57 ATTACHMENT VISA OF THE SERVICE CONCERNED		THE ENGINEER CHIEF OF VBA DIVISION  NGUYEN NGOC LAM		THE MANAGER OF VN RAILWAYS  VAN DINH VINH		TRACED BY
DATES 9.7.62		MODIFICATIONS VERSION ANGLAISE		RAILWAYS OF VIETNAM  V B C T 011 <sup>18</sup>				