CHAPTER VI

BENEFITS FROM THE PROJECT

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6.1 BENEFITS CONSIDERED

In connection with Pioneer mine project, the project road will be newly built or improved, and a new port will also be constructed near Tangub city. This road improvement and port development are expected to bring about a great deal of transport benefits and direct and indirect associated benefits. The basic methods applicable to measuring these transport benefits is to estimate the difference in transport cost between the "without" and "with" road improvement and port development case.

The difference in transport cost of road improvement cost can be estimated by the difference of vehicle operating costs between under existing road condition and under improved road condition. Vehicle operating costs are derived for five representative vehicles that are currently used on the project road.

Transport benefits accruing from port development can be estimated as the difference of transportation cost between by road and by sea. On completion of new Tangub port, the cargos and passengers to and from Tangub city will be

directly loaded/unloaded and embarked/disembarked without any transfer to inland transportation at the existing Ozamis port. Usually ocean freight is much cheaper than inland transportation cost.

So, this cost difference can be regarded as transport benefits.

Associated benefits, direct and indirect, are also summarized in chapter 6.4.

6.2 TRANSPORT BENEFITS FROM ROAD IMPROVEMENT

6.2.1 General

Of an entire stretch of the project road, 5.9 km section near the mining site is a new road. It is expected that this new road will be used exclusively for iron ore transportation and less frequently used by the people living there. Since this area, sparsely populated, has no promising development except mining exploitation, it is understood that future traffic volume will be considerably low, so that in this benefit study this section has been left out. Additionally, the section between Labuyo and Tangub port has also been deleted due to the absence of reliable base year traffic data.

Therefore, two sections (provincial road 32.5 km, national road 34.7 km) have been taken for assessing transport benefits accruing from the project road improvement.

6.2.2 Vehicle Operating Cost (V.O.C)

The vehicle operating cost can be estimated depending on the following road factors;

i) Pavement : Asphalt, gravel, earth

ii) Status : Good, fair, bad

iii) Gradient : Flat, rolling, mountainous

Operating costs are first derived under ideal operating conditions on straight and level roads. Factors are then provided to enable adjustment of these costs to reflect non-ideal operating conditions.

The respective vehicle operating cost is figured out by multiplying V. O. C. in ideal condition by road influence factors. The five representative vehicles used in this study have been derived from the results of traffic survey discussed in chapter 3.1.1. They are car, small bus, large bus, light truck and heavy truck.

Table 6.1 V.O.C IN IDEAL CONDITION

Vehicle	fuel	tire	maintenance	depreciation	Total
Car	0.087	0.034	0.058	0.214	0.393
Light truck	0.248	0.101	0.243	0.380	0.972
Heavy truck	0.329	0.123	0.219	0.398	1.069
Small bus	0.201	0.109	0.081	0.215	0.606
Large bus	0.228	0.123	0.092	0.243	0.686

Table 6.2 ROAD INFLUENCE FACTOR

Surface Condition		Flat		Rolling		Mountainous	
		Light vehicle	Heavy vehicle	Light vehicle	Heavy vehicle	Light vehicle	Heavy vehicle
Paved	Good	0.00	0.00	0.22	0.53	0.68	1.20
	Fair	0.20	0.30	0.41	0.80	0.83	1.43
	Bad	0.40	0.60	0.61	1.08	1.03	1.73
	Very bad	0.60	0.90	0.81	1.36	1.23	2.03
	Unpassable	0.90	1.35	1.22	2.04	1.85	3.05
Gravel	Good	0.15	0.25	0.36	0.77	0.78	1.40
	Fair	0.30	0.50	0.51	1.00	0.93	1.63
	Bad	0.60	0.90	0.81	1.38	1.23	2.00
	Very bad	0.90	1.30	1.11	1.77	1.53	2.40
	Unpassable	1.35	1.95	1.67	2.65	2.30	3.60
Earth	Bad	0.90	1.30	1.11	1.77	1.53	2.40
	Unpassable	1.35	1.95	1.67	2.65	2.30	3.60

Flat: Average gradient less than 3 per cent

Rolling: About 2/3 of the gradients between 3 and 5 per cent and about 1/3 of the gradients between 5 and 7 per cent

Mountainous: Gradients larger than 7 per cent

In general, about 2/3 of the gradients are less than 400 meters long.

6.2.3 V.O.C Saving

In accordance with the project road improvement program discussed in chapter 4.3, the road condition of the existing gravel road will be upgraded to "good". Therefore, the road influence factors in the existing road will be reduced. This reduction will lead to the V.O.C saving through the following procedure.

$$\text{V.O.C. SAVING} = \Sigma\{\text{VID} \times (\text{RIF}_1 - \text{RIF}_2) \times \text{DIS}\} \times 365 \times \text{ADT}$$

VID : V.O.C. in ideal condition

RIF_1 : Road influence factor in existing road condition

RIF_2 : Road influence factor after road improvement

ADT : Average daily traffic

DIS : Distance of road section

The future V.O.C. saving can be estimated through 1999 by use of results of traffic projection assumed in chapter 3.3. The values of RIF_1 have been developed from the data of inventory survey.

Table 6.3 TRANSPORT BENEFITS FROM ROAD IMPROVEMENT

(unit: peso)

		normal traffic	
		National Road	Provincial Road
1	1980	(under construction)	
2	81		
3	82	929,845	77,920
4	83	990,251	81,461
5	84	1,049,791	85,003
6	85	1,117,121	154,129
7	86	1,190,818	162,193
8	87	1,274,464	166,226
9	88	1,355,815	174,290
10	89	1,447,936	182,355
11	90	1,529,712	193,271
12	91	1,620,386	205,368
13	92	1,715,695	217,876
14	93	1,813,770	228,792
15	94	1,906,303	240,888
16	95	2,016,896	255,837
17	96	2,134,960	270,786
18	97	2,255,793	285,734
19	98	2,389,141	303,535
20	99	2,525,844	318,483

6.3 TRANSPORT BENEFITS FROM PORT DEVELOPMENT

6.3.1 General

On completion of the Tangub port, seaborn traffic to and from the existing ports such as Ozamis port and Pagadian port will be affected to some extent. The commodity and passenger flow will be shifted to less costly traffic modes as explained below.

i) A certain part of cargos handled at the Ozamis port is being transported up to or beyond Tangub city. On completion of the new Tangub port, some portion of this cargos will be directly shipped at Tangub port without any transshipment at Ozamis port.

ii) The same inclination will be staged in the passenger flow.

iii) As stated in chapter 1.2, a large-scale coconut plantation is being developed in the vicinity of Switch area. It is likely that this coconut will be transported by land up to the proposed port instead of transporting to the existing Pagadian port in case that inland transportation cost to the proposed port is more economical.

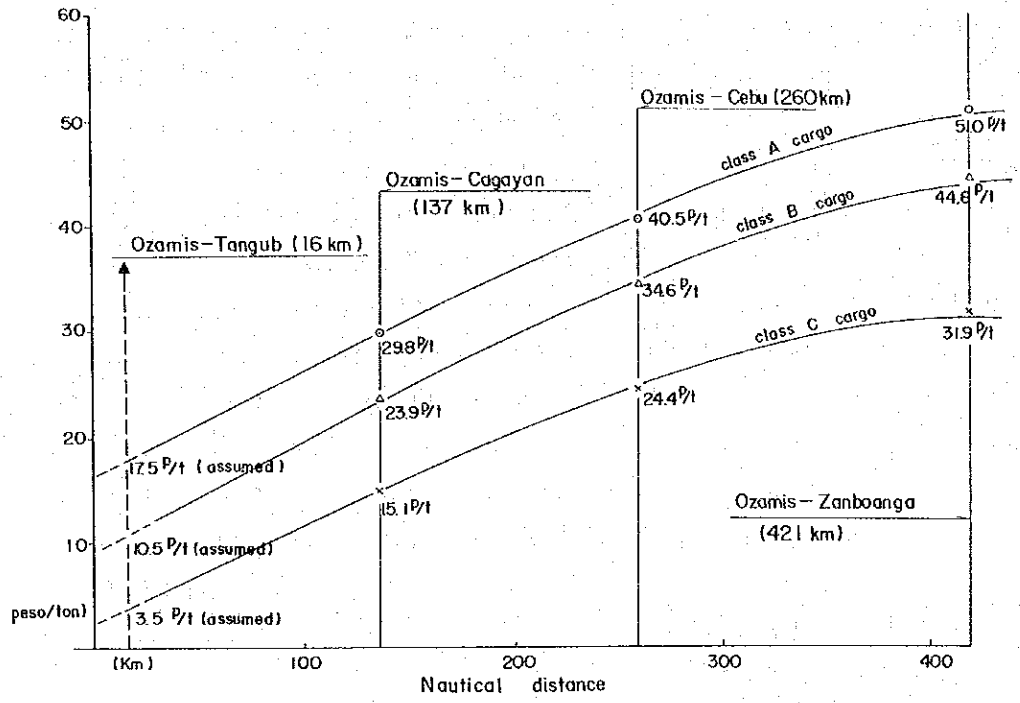
iv) Generally, the Ozamis port is not congested, though, due to short berthing pier, no 1 & 2 pier appear to have some trouble when 4,000 D.W.T. class vessels are in berth. A new pier at Tangub port will take care of some ships of this 4,000 D.W.T. class vessels.

6.3.2 Saving of Cost of Cargo Transportation between Ozamis Port and Tangub Port

As assumed in 3.1.2, through Ozamis port about 55,600 ton of port cargo was transported to and from Tangub city. In terms of inland transport cost saving, it is more economical that whole amount of this cargo is directly unloaded at Tangub new port. However, such possibility is very less, because the liners of long distance voyage from Cebu city or Manila city is not likely to arrive at new port after having destinated at Ozamis port (Ozamis port is 16 km away from Tangub new port). Therefore, it is expected that only coastal vessels will call at the proposed new port. In our study, the amount of this cargo to be handled by coastal vessels has been assumed to be 20% of all port cargos bound for Tangub through Ozamis port. Additionally, annual growth rate of this port cargo has been assumed to be 6% following the past growth rate of port cargo in Ozamis port. Based on this assumption, the cargos to be directly unloaded or loaded at Tangub new port can be calculated through the year 1999.

Cargo transportation cost between Ozamis and Tangub can be saved if existing truck-transportation is replaced by ship. Since there is no anthorized ocean tariff between Ozamis port and Tangub port, the ocean freight between this route has been tentatively established considering the existing tariff in the vicinity of Tangub port.

Fig. 6.1 EXISTING OCEAN FREIGHT OZAMIS-CEBU



class A cargo : tires and similar goods
class B cargo : cercel and similar goods
class C cargo : steel and similar goods

As shown in Fig. 6.1, tariff of three different classes has been developed. The major commodity to be transported on new route belongs to class B, so that 10.5 peso/ton has been applied to cost saving calculation. On the other hand, inland transportation cost by truck has been determined at 15 peso/ton by use of the current freight charge of truck. On the basis of above assumption saving of cost of transportation between Ozamis and Tangub has been calculated and tabulated on Table 6.5.

6.3.3 Saving of Passenger Transportation between Ozamis Port and Tangub Port

As assumed in 3.1.2, about 59,000 persons were either going toward Tangub city after disembarking at Ozamis port or going to Ozamis for embarking. On completion of Tangub new port some of the passenger will be transported directly to and from Tangub port by the use of coastal ferry service which is to be established between Ozamis port and Tangub new port. The percentage of passengers who prefer this ferry service has been tentatively assumed to be 20% in this study. Most of the passengers at present take bus service to Tangub city, whereas some passengers take taxi. Here in this study using onroad survey data, it has been assumed that bus passengers would account for 90% and taxi passengers 10%. Additionally, for annual growth of passenger traffic, the growth rate of traffic projection which had been made in chapter 3.3 has been applied.

On the basis of the above assumption, the number of passengers who are likely to use ferry service after port development and who would have used bus or taxi service without port development, have been estimated.

The current fare of bus and taxi between Tangub and Ozamis is 4 peso/person and 30 peso/person respectively. On the other hand, no tariff has been set for new ferry service. The fare of existing route is tabulated hereunder.

Table 6.4 OCEAN FARE

(peso/person)

	1st class	2nd class	3rd class	Nautical distance
Ozamis-Cebu	63.15	37.45	25.40	260 km
Ozamis-Iligan	5.40	5.40	5.40	30 km

Putting unit ocean fare of 0.18 peso/km that has been developed from Ozamis - Iligan route into the nautical distance of new route between Ozamis and Tangub (16 km), the fare of ferry service can be estimated at 2.9 peso/person. Therefore, bus passenger and taxi passenger would save 1.1 peso/trip and 27.1 peso/trip respectively.

Incorporating the above cost factor into passenger traffic projection, the yearly cost saving of passenger transport has been calculated and given on Table 6.5.

6.3.4 Saving of Coconut Transportation Cost From Switch Plantation

Around Switch area, coconut plantation is being developed in large scale at an area of 22,000 ha. According to the regional data, about 1,300 kg of coconut can be harvested in one hectare of coconut farm land. Therefore in full operation about 28,600 ton of coconut will be produced per year. This plantation is at present in the stage of planting, but by 1984 it will be in full operation, so it has been assumed that the productivity would increase by 20% each year through 1984 from 1980.

This coconut will be transported either to Tangub port or Pagadian port. The distance difference is 1.5 km advantageous to Tangub port. Adding road condition factor discussed in chapter 6.2 transport benefits (V.O.C. saving) can be estimated as shown on Table 6.5.

6.3.5 Benefits from The Operation of 4,000 DWT Vessel

The ship class of freight capacity ranging between 1,000 - 2,000 DWT is now being operated in Ozamis port.

to be scarce for the time being. However, in the near future, it is expected that the operation of 4,000 DWT class freighter will be more frequent. To cater for this situation, 4,000 DWT berth is absolutely necessary. Fortunately a new Tangub berth can accommodate the vessel up to 6,000 DWT, so that future traffic of this class vessel will preferably be operated at this new port.

The freighter of this class is now being operated on long distance transportation between Manila and Ozamis rather than in medium or short distance voyage.

The ocean freight saving by the operation of 4,000 DWT freighter in place of 1,000 DWT freighter has been estimated around 15.4 peso/ton between Manila - Tangub.

Assuming that the average consignment of 500 ton from Manila is handled at the new Tangub port once a month, cost saving can be estimated at 92,400 peso/year. If this kind of cargo is expanded in proportion to the annual growth rate of port cargos (6%), yearly cost saving can be accessed as given on Table 6.5.

6.3.6 Accummulated Transport Benefits From Port Development

The benefits assessed in chapter 6.3.2 - 6.3.5 are summarized on the following Table.

Table 6.5 TRANSPORT BENEFITS FROM PORT DEVELOPMENT

	Year	Cargo	Passenger	Coconut	40,000 ton
0					
1	1980		(under construction)		
2	81				
3	82	58,038	53,414	79,032	103,821
4	83	62,392	57,151	102,083	110,050
5	84	67,348	61,154	128,427	116,653
6	85	70,674	65,434	128,427	123,652
7	86	89,889	70,015	128,427	131,072
8	87	76,698	74,914	128,427	138,936
9	88	85,684	80,156	128,427	147,272
10	89	86,553	85,770	128,427	156,108
11	90	100,504	90,488	128,427	165,475
12	91	99,903	95,464	128,427	175,403
13	92	105,960	100,714	128,427	185,928
14	93	110,071	106,253	128,427	197,083
15	94	120,726	112,099	128,427	208,908
16	95	130,436	118,263	128,427	221,443
17	96	139,138	124,768	128,427	234,729
18	97	139,332	131,627	128,427	248,813
19	98	145,828	138,868	128,427	263,742
20	99	157,489	146,506	128,427	279,566

6.4 OTHER BENEFITS

6.4.1 Direct Intangible Benefits

Besides the trnasport benefits calculated before, the following items can be taken as the direct intangible benefits.

i) At present, some of the existing bridges have only one lane. These bridges will be widened to cater for two-lane-traffic.
This improvement will diminish the traffic congestion and accompanied accidents.

ii) The present road condition is not so good that the speed of the cars have to reduce to dead slow.
On completion of road improvement, the design speed will be assured through the entire length of the project road. This fact will help for more comfortable and speedy driving.

iii) The existing road is not treated for dust prevention even in the densely populated section.
Since these sections will be asphalt-paved, these will be less dust pollution.

iv) The existing road is frequently innudated in the plain area. These sections will be provided with concrete culverts for good drainage. This improvement will solve the problem of traffic stop.

6.4.2 Indirect Intangible Benefits

i) During the field survey, it was consistently found that the people living along non-accessable-road are in poor health condition.
The road improvement and new access will ensure the regular health care service and will lead to

upgrading or regional health condition.

ii) The standard of educational service with good road is higher than that with poor roads. The poor road and lack of public transport makes commuting extremely. The road improvement will after all facilitate to school attending and commuting, which will help to raise the living standard of people.

iii) The road condition and public peace & order is closely interconnected. This relation exists in this project area. At present, the area is only accessible by foot and the police control work, and the public activities for peace and order is weak. On completion of new road such discomfort will be eliminated.

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