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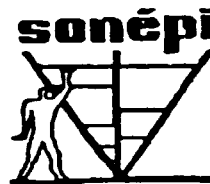
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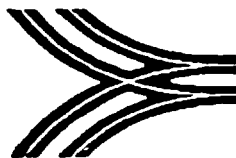
SIDEM Engineering

116 Route Neuve - BOUZAREAH
ALGER/ALGERIE
Téléphone : [213](2)94.15.66 - 94.16.71 - 94.14.65
Télécopie : [213] (2) 94.17.59 - 94.19.12
Télex : 61.295 DZ - 61.397 DZ

Société Nationale d'Etudes et de Promotion Industrielle

Avenue BOURGUIBA Prolongée - B.P. 100
DAKAR / SENEGAL
Téléphone : [221] 25.31.30 / 25.51.80
Télécopie : [221] 24.65.65
Télex : 61 178 SONEPI / SG

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S.N.T.F. / EMF

Société Nationale des Transports Ferroviaires
Engineering du Matériel Ferroviaire
04 Chemins de KOUBA
ALGER / ALGERIE
Téléphone : [213] (2) 58.71.30
Télécopie : [213] (2) 58.24.32
Télex : 62 334 DZ

BATIMETAL

Entreprise Publique de Construction de Bâtiments Industrialisés
Zone Industrielle B.P. 44000
AIN DEFLA / ALGERIE
Téléphone : [213] (3) 45.24.31 - 45.24.02
Télécopie : [213] (3) 45.24.41
Télex : 78 082

PRE-FEASIBILITY STUDY FOR THE DEVELOPMENT OF EXISTING REGIONAL PLANTS FOR THE MANUFACTURE OF TRANSPORT EQUIPMENTS :

Complex of SNCS units at THIES in SENEGAL

INVESTMENT PROJECT REPORT

October 1993 / English

WORKED OUT BY THE UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION ON BEHALF OF AFRICAN GOVERNMENTS



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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

VIENNA INTERNATIONAL CENTRE
PO BOX 300, A-1400 VIENNA (AUSTRIA)
Telephone : 211.310 - Telegraphic address : UNIDO VIENNA - Telex 135 612 - Fax : 323 156

**PRE-FEASIBILITY STUDY FOR THE DEVELOPMENT
OF EXISTING REGIONAL PLANTS FOR
THE MANUFACTURE OF TRANSPORT EQUIPMENTS**

Pre-feasibility study of rail equipments maintenance units
located at THIES in SENEGAL and belonging to
SNCS (Société Nationale de Chemins de Fer SENEGALAIS)

INVESTMENT PROJECT REPORT

Number : DU/RAF/89/850

Person in charge of the project	M. Yves Ekoué AMAIZO UNIDO. Feasibility Studies Department, Industrial Investment Division
Expert construction engineer (Team chief)	M. Omar BENABDERRAHMANE SIDEM Engineering organisation Algiers, Algeria
Expert industrial studies engineer	M. Madlagne DIAKHATE SONEPI organisation Dakar, SENEGAL
Expert rail equipments engineer	M. Mohamed MADAGH BATIMETAL organisation Algiers, Algeria
Expert rail equipments studies engineer	M. Brahim HASNAOUI SNTF/EMF Algiers, Algeria
Expert economics (Economy/Finance)	M. Hacène HARZFLI SIDEM ENGINEERING organisation Algiers, Algeria

The present study has been carried out by UNIDO experts who received information, advices help and comments from the following bodies :

- Equipment and Surface Transports Ministry
(His Excellency, Mister Landing SANE, Minister)
(M. MBAYE NDAO Technical Adviser. Telephone 23 60 99)
- Industry, Commerce and Craft Ministry
(M. SIMON DIOH Director of Industry. - Telephone : 32 07 26)
- Integration, Plan, Finance and Economy Ministry
(M. DAVID SAGNA Branch Development Planning and Evaluation. - Telephone : 23 65 63)
(M. SAMBOU MANE TOURE African Communities Organisation Director).
- Town Ministry
(His Excellency Mister Daour CISSE, Minister)

- PRIMATURE. GENERAL DEPARTMENT FOR THE REFORM OF THE PARA PUBLIC BRANCH.
(M. GABRIEL FAYE Technical Adviser. - Telephone 21 47 67)

- WORLD BANK
(M. Alassane Kéba DIAWARA. Executive in charge of operations. - Telephone : 23 36 30).

- Economic Promotion Fund
(M. Cheikh DIOUM)

- UNDP/UNIDO, DAKAR

- Société Nationale de Chemins de Fer du SENEGAL (SNCS)

- Representative of the General Manager of the Régie des Chemins de Fer du MALI (RCFM) in Dakar
(M. SAKHO. _ Telephone : 21 73 71).

The experts would like to express their best thanks and gratefulness to the above named personalities and organisations⁽¹⁾.

¹ This report does not necessarily express the views of the United Nations Industrial Development Organisation.

ABSTRACT

PRE-FEASIBILITY STUDY FOR THE DEVELOPMENT OF EXISTING REGIONAL PRODUCTION PLANTS OF TRANSPORT EQUIPMENT IN SENEGAL

The development of the States of the West African Sub-region is all the more tied up to the development of transport systems because many countries are enclosed and territories are very vast.

SENEGAL occupies a privileged position and possesses means and infrastructures which have been identified during the initial opportunity study conducted by UNIDO⁽²⁾ which showed that SNCS might be designated as a catalysing firm for the sub-region.

The SNCS copes for the needs of the country in goods and passengers traffic and cooperates with the Chemins de Fer du Mali (CFM).

SNCS operates the DAKAR-BAMAKO line which crosses the whole country from west to east and also part of the Malian territory.

In the town THIES which is located 70 Km west of Dakar, SNCS operates an important maintenance facility for equipment and material pertaining to railways. It has been set up on a terrain extending on approximately 66 Ha. Part of the existing installations might be used in the future to carry on repair, maintenance and manufacture of transport equipments.

The fulfilment of this objective implies the reorganisation of SNCS into two large autonomous firms :

- The first one dealing exclusively with goods and passengers transportation and with the operation of the network and the rolling stock.

Such activities will generate resources and profits.

- The second firm will undertake all activities related to the repair and the maintenance of equipments and materials pertaining to railways.

These activities are presently generating recurrent charges for SNCS.

The whole line of activities could then be rearranged in order to tie together several autonomous firms among which local or sub-regional sub-contractors may be listed.

With regard to this matter it is noticeable that large firms such as :

- SEFICS (Transportation of chemicals by railroad)
- SSPT (THIES phosphates)
- CSPT (TAIBA phosphates)

which carry on by themselves the rail transportation of their goods, face the same common problems in repair and maintenance.

Considering the above factors and situation it has been unanimously admitted that the major recommendation of the pre-feasibility study should be the following :

The setting up of a new autonomous society the main activity of which is the repair, the maintenance and the production of equipments pertaining to railways.

The present study allowed the identification of the project configuration which includes :

- Production and machining department,
- Rolling stock equipment,
- Related infrastructures.

The setting up of the various shops, their complementarity and specificity authorises physical separations through party walls.

In the near future and with a work force of 308 agents, existing pieces of work and facilities could allow the project to become operational and produce annually :

- about 300,000 hours (maintenance of 1,100 carriages, 100 passenger coaches and various sub-contracting operations in machining and machine finishing).
- The assembly of about 60 new carriages. (The assembly capacity could reach about 130 carriages according to the local and sub-regional demand).
- The production of rolling tip wagons and tanks of various types.

- The production of various simple equipments needed by hydraulic concerns (pumps, valves, accessories) and by agriculture (parts and various tools).

The accomplishment of this project would require the following investments :

- Estimated total cost of the project 5.000.000,000 CFA F

Including :

- . Estimated cost of the actualised existent facilities 2.360.000,000 CFA F
- . New purchases cost 2.640.000,000 CFA F

Based on the hypotheses took into consideration in the study, the appraisal parameters for the financial profitability of the project are the following :

- Estimated annual turnover 4,450,000,000 CFA F
- Profit on the 5th year :
 - . Before taxes 982,960,000 CFA F
 - . After payment of taxes 638,924,000 CFA F
- Pay back period 5 years and 9 months
- Internal rate of return 15.62%
- Break-even point for the 5th year of production (starting from the plant setting up). 51% of the program;

The outcome of the analysis leads to the conclusion that the SNCS project is a major industrial investment which deserves being considered by the Government as a national priority and officially included in the national investment program.

Beyond the stimulating effect on the economy of the SENEGAL, in peculiar and on the sub-region in general, the accomplishment of this project will give SNCS the opportunity to reorganise and concentrate its action on the company management and the railway network and rolling stock operation.

Given the huge size of SNCS and the importance of its THIES shops, it is recommended to analyse in detail all other factors (the socio-economical effects in particular) in order to ensure its viability.

SENEGAL MAP

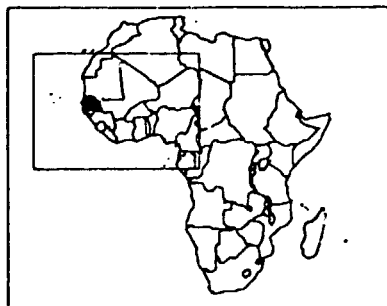
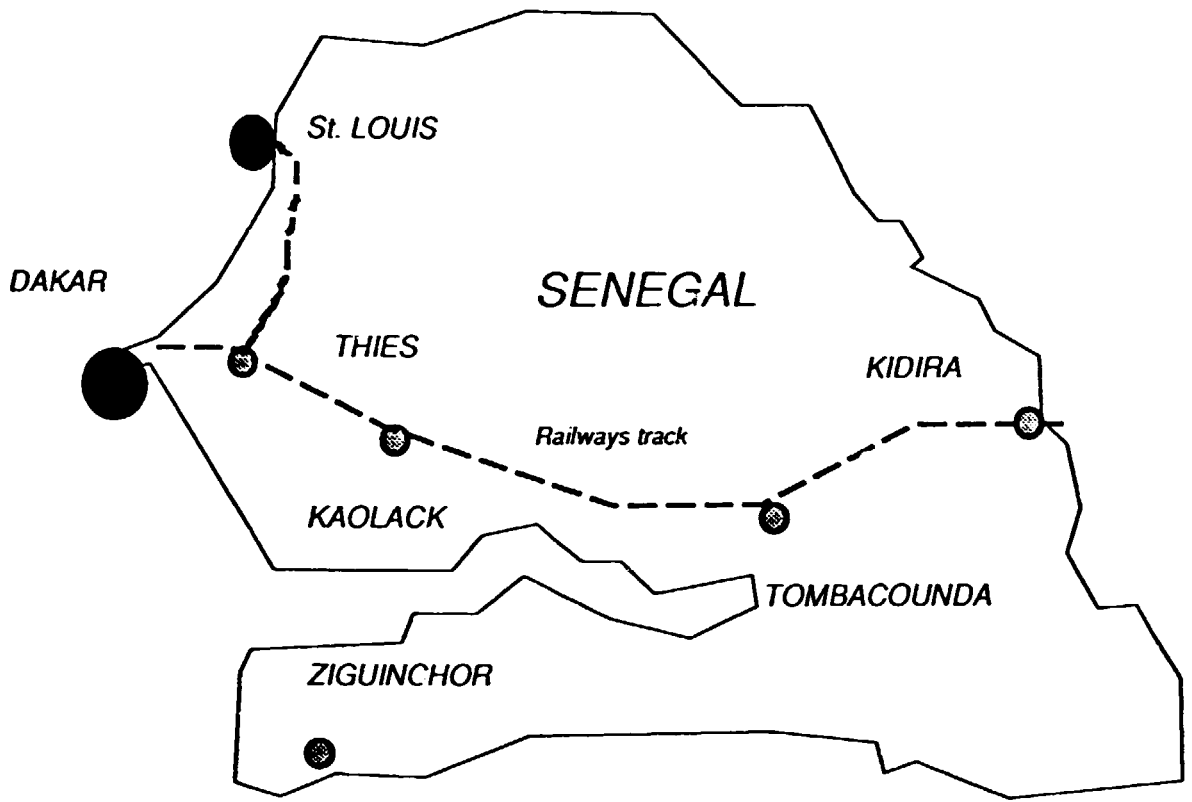


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1. PROJECT BACKGROUND

The development of the sub-region in general and of SENEGAL in particular is closely related at the improvement of transport systems.

Due to the present condition of the networks and the available means and facilities, the present situation is far from being adequate to cope with the increasing needs of the economies of the sub-region countries (WAEC).

Furthermore, the present decay of the networks summons up huge resources for their maintenance which precludes any possibility for development.

The under-development situation of the sub-region countries and the absence of external accesses for most of them generate the need for large transportation axes, mainly railways, in order to cope with the continuous increasing exchanges.

SENEGAL, which has a considerable railways infrastructure, has also a privileged geographical situation. Therefore SENEGAL is prone to alleviate the access difficulties of certain sub-region countries on one hand, and to act as a catalyist in the development process of the sub-region on the other hand.

The directions adopted by the Senegalese State are aimed towards this objective which implies the reorganisation of the transport system, namely the railways, in order to set up efficient and flexible production facilities, governed by commercial profitability rules so that the plant everlastingness is ensured without recourse to state help.

Such new conditions will allow the setting up in SENEGAL of plants able to produce transportation equipments, sub-branch where the main source for procurement is import from abroad.

2. THE SNCS AND THE PROJECT

2.1. The SNCS firm

The Société Nationale de Chemins de Fer du Sénégal, labelled SNCS resulted from the transformation of the Régie des Chemins de Fer du Sénégal (RCFS).

It was created on the first November 1989 under law 89-34 issued on October 1989.

In section II of that law the purpose of SNCS was stated as "organizing

and operating railways transportation on a national scale".

Because of its size and the scope of its activities, SNCS is considered as one of the essential tools for the development of the country on one hand, and as the major vector for sub-region cooperation on the other hand.

Wanting to develop this important national and sub-regional tool on sound productive and competitive grounds, the Senegalese State undertook a vast program for the reorganisation of the railways activity which aims at a total management autonomy of SNCS which has henceforth to act on a commercial basis in competition with other transport modes.

To attain the assigned objectives a four years performance contract has been signed between the State and SNCS for the 1990-1993 period.

This performance contract specifies the major outline of the policy which SNCS has to follow in order to improve its operations and competitiveness. The stated objective is to preserve the attained achievements and to re-conquer the freight market, to develop the container traffic, to increase passengers traffic and to conquer new markets.

In spite of their insufficiency, the results and performances achieved by SNCS place the latter as one of the most efficient rail network in West Africa.

2.2. The project

The major objective expected from the project is to identify the homogeneous and viable entities capable, in the near future, of producing transportation equipment in acceptable profitability conditions. This identification relies on the analysis of the potential of SNCS in THIES, the existing industrial tissue at the national and the sub-regional scales and the demand of the national and sub-regional markets.

The SNCS shops located at THIES, owing to :

- Their size,
- The existing means and infrastructures,
- Their capability to cope with railways transportation needs and also their capacity to undertake various other industrial activities.

stand out for the setting up, in the near future and without requiring major investment in a first stage, of viable autonomous and homogeneous entities able to make up a first transportation equipment production complex.

At the present stage of the study the three (3) major shops identified as profit centres are the followings listed in order of their ability to be raised to the level of autonomous entities :

1/- The rolling stock plant which includes :

The carriages halls,
The coaches halls,
A painting section,
A park for bogies.

2/- The production and machining plant which includes :

The machining shop,
The sheet metal work shop,
The forge,
The metals and light alloys casting shop,
The wheel turning shop.

3/- The rolling power units plant which includes :

The diesel engines section,
The bogies section,
The electrical section.

In the event of a future reorganisation of SNCS, other entities may also be raised to autonomous subsidiaries of SNCS in a further stage. These are :

- Rail equipment and works
- Signaling and telecommunications

The project would then be constituted of the rolling stock shop and the machining and production shops. Such an entirety, in the near future and with minor fittings and additional equipments, would be able to produce carriages, coaches and other transportation equipments such as buses and other services⁽³⁾

³ Please refer to the market study

In that case, the production and machining shop which, alone, might be raised to autonomous entities, operating in priority to satisfy the SNCS needs (maintenance of carriages, coaches and power units) and at the same time for the project (carriages assembly) would also be considered as a sub-contractor for others industrial plants.

In a longer run and after the project is stabilized the adding of the power units shop might be considered in order to increase the capacity of the project and to allow the latter to contemplate the possibility of assembling rolling power units.

The detailed execution study to be conducted should determine the new configuration of SNCS, its new missions, objectives and ties with the new entities to be set up.

3. GENERAL INDICATORS

3.1. General data

SNCS is responsible for all the railways transport in SENEGAL.

The exchanges density and its cooperation ties with Régie des Chemins de Fer du Mali (RCFM) bestow a sub-regional dimension on SNCS in the operation of the DAKAR-BAMAKO axis.

SNCS operates a 906 Km network, 70 Km of which are double track. Its human and physical resources are :

3.1.1. Physical resources⁽⁴⁾

3.1.1.1. Rolling power units fleet.

The relatively aged rolling power units fleet includes :

- 27 locomotives

3	BB 1100
3	BB 1200
10	BB 1600

⁴ Source : January 1993 monthly activity report

3 CC 1300
2 CC 2000
6 GC 2400

- 5 rail-cars

2 ZE 120 SOULE
3 ZE 140 MAQUINIS

- 15 towing and manoeuvring vehicles

4 AA 10
1 AA 50
2 AA 70
3 BB 40
1 BB 60
2 EB 500
2 BB 1100

3.1.1.2. Towed vehicles fleet

The towed vehicles fleet includes the following carriages and coaches :

766 carriages distributed as follows :

Carriage type	International traffic	Domestic traffic
Platform	192	3
Tip-cart	120	0
Covered	377	50
Tanks	13	11
T O T A L S	702	64

80 coaches distributed as follows :

29 Express coaches
36 Slow PTB coaches
15 Slip coaches

3.1.2. Human resources

2,065 employees distributed as follows :

113	managerial staff
1.252	supervisory staff
700	execution staff

3.1.3. Turn over and traffic

In 1992, the SNCS realized a turn over of :

9,674,365.000 CFA F	
and made a profit of the amount of :	
203,540,000 CFA F	before tax
150,975,000 CFA F	after tax

It achieved the following traffic :

FREIGHT : 474,459 Transported Tons Kilometres distributed as follows :

211,499 TK	International traffic
262,960 TK	Domestic traffic

PASSENGERS : 155.146 Passengers Kilometres corresponding to 4,320,269 transported passengers.

3.1.4. 1993 Objectives

For the year 1993, budgetary previsions are :

3.1.4.1. Freight traffic

2,301,000 T	Domestic traffic
432,000 T	International traffic
2,733,000 T	TOTAL

3.1.4.2. Passengers traffic

504.000 pax	Domestic and Rail-cars traffic
3.450.000 pax	Small Blue Train
90.000 pax	International traffic
4.044.000 pax	TOTAL traffic.

Total revenue of SNCS expected from the 1993 operations is set to :

10,670,000,000 CFA F

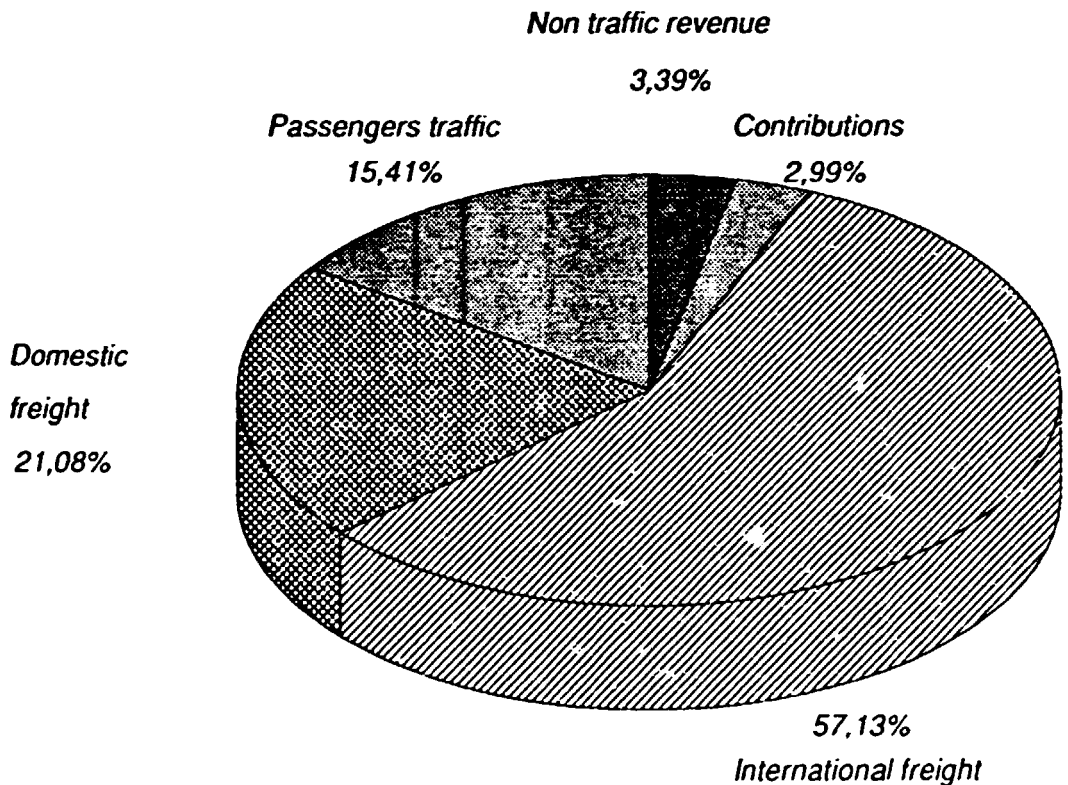
with :

298,538,000 CFA F net profit

and :

317,322,000 CFA F state subsidy

The expected revenue is distributed as follows :



Freight and passengers revenues are expected to total :

9,996,000,000,000 CFA F

They are distributed as follows :

Traffic	Domestic	International	TOTAL	
			#	%
Freight	2.250	6.096	8.346	83.5
Passengers/luggage	705	540	1.650	16.5
Commuter	405			
TOTAL	3.360	6.636	9.996	100.0
%	33.6	66.4	100.0	

Freight traffic generates 83.5% of total transport revenue.

International traffic generates 2/3 of total SNCS revenue.

Given the evolution of the transport context which is characterized by a harsh competition between various transport modes, the prevalent monopoly situations should give way to productivity and competition concepts.

It is along this guide-line that the SNCS is being reorganized.

The setting up of a production plant for transportation equipment to start from THIES facilities of SNCS, should alleviate the SNCS burden due to unused capacity. This will allow SNCS to devote all its energy to its genuine activities which are related to the management and the operation of its railways networks.

Repair and maintenance of the towed and driving rolling stock and of the infrastructures would be carried on through autonomous entities consolidated within a holding to be set.

3.1.5. Forces and weakness

Given its configuration and the on going evolution, the Senegalese railways transport system shows weaknesses on one hand but has powerful advantages on the other hand.

3.1.5.1. Weaknesses

The long lasting lack of efficiency of the maintenance function, owing to insufficient financial resources and to the inadequate legal status

5 Traffic with MALI essentially (RCFM).

of the organisation, requires henceforth heavy rehabilitation investment programs which will summon up huge financial capacities on the top of the amounts required by the modernisation and the development of the railways transport system.

In this regard, SNCS, which has to preserve its existing means, will be induced to devote important resource to this activity and, therefore, will not be in position to cope efficiently with the needs generated by the required revamping of its tools.

3.1.5.2. Positive aspects

In this highly competitive context, the major advantage of the Senegalese transport systems, and particularly the railways system, derives from the privileged geographical situation of SENEGAL in the sub-region.

This advantageous position turns SENEGAL as a "hub" for international transport.

Through a judicial structural reorganization and given the infrastructures of SNCS and the important THIES facilities, it becomes possible to adapt to the new requirements of the international context.

4. MARKETING

Given its reorganization and its role as a network operator, SNCS will have to progress in a highly competitive market. It will have to adapt to this new context, through an appropriate marketing policy in order to enhance its commercial image and have a maximum credit with its clients.

The objective is to improve the quality of service and to reduce costs.

Considering the project strictly speaking, the impact of its setting up on the development of the country in general and on the sub-region in particular, is such that it deserves benefiting from an active and committed aid from every institution and establishment.

Within the framework of the project, SNCS will set a special dynamic sales department in order to valorize every opportunity allowed by the multivalence of the available equipments.

5. MATERIALS AND OTHER PRODUCTION FACTORS

All purchases and acquisitions are centralised within the Procurement Department.

The annual budget for the purchases during the year 1993 amounts to :

2.320.000.000 CFA F.

It concerns fuel, combustibles, spare parts and common commodities.

For 1992 this budget amounted to :

2.489.000.000 CFA F

Owing to the shortage in hard currencies, the banking procedures, the lack of material planning, the vagueness of the technical specifications, the consulting and delivery delays and to the customs, procurement within SNCS is not streamlined.

Such constraints derive mainly from the legal status of SNCS (state-owned).

The very objective and effect of the proposed reorganisation is to allow a new department to have at its disposal the required means to remove most of the constraints.

The analysis described under section 3 above shows the main production factors.

6. LOCATION, SITE, ENVIRONMENT

The Société Nationale des Chemins de Fer Sénégalais has its headquarters east of the town THIES which is 70 Km distant from the capital DAKAR.

The geographical location of THIES turns this town to a hub as far as road and railways communications are concerned.

No doubt that particular situation justified from the beginning the selection of THIES as the location where to set up the shops which were to ensure the maintenance and the renovation of the railways networks of the sub-region.

It is starting from THIES that the railways network links DAKAR to the northern town of St LOUIS via a 262 Km long track. The other line links DAKAR and the eastern town of KIDIRA via a 643 Km long track which crosses the country from west to east and continues towards BAMAKO in MALI.

At THIES, SNCS is laid out on a terrain the total surface of which is 656.851 m² from which 84.828 m² are roofed.

The constructions have the following surfaces :

Offices	9,166 m ²
Shops	44,389 m ²
Housing	31,273 m ²

The site is supplied with 6,600 V electricity from the SENELEC public network.

Water comes from a drill hole located on the SNCS site. This free of charge water supply contributes to the cost reduction.

Owing to the existing structures, means and space and given the availability of energy, water, labour and communication means, the SNCS shops of THIES constitute an ideal location to set up the pilot project for the manufacture of transportation equipments.

The SNCS activities, which arise no pollution problem at all for the environment, are important and necessary for the town and its region. Both of them will benefit from the accomplishment of the project which will have noticeable stimulating effects.

7. TECHNICAL ASPECTS : TECHNOLOGY AND ENGINEERING.

For the setting up of the project for the manufacture of transportation equipments the SNCS shops at THIES show the following main advantages :

- They exist physically.
- The required means and infrastructures are already available,
- Their services and works are specialised in the railways domain as far as equipment and personnel are concerned.

Nevertheless they are relatively aged and decayed. They require rehabilitation and modernisation.

In terms of production capacity, the various shops show the following possibilities :

- Production and machining shops.

These shops are able to manufacture a wide range of the parts needed by the rolling stock maintenance. They are equipped with machining, forging and moulding means and sheet metal works facilities.

Their fitting out within the project framework should allow them to produce annually about 300,000 hours and hence to cope with a large portion of the project needs.

- Rolling stock shops

These shops are spacious enough to allow the maintenance and the assembly of the carriages.

With few necessary arrangements within the framework of the pilot project, they might be able to ensure very rapidly :

- The maintenance of 1,100 carriages and 100 coaches.
- The assembly of 60 carriages and possibly 50 passenger coaches.

The carriages assembly capacity might reach about 130 units per annum according to the domestic and sub-region demand.

- The manufacture of various tip wagons and towed tanks.
- The manufacture of hydraulic components (pumps, valves, accessories) et parts and various tools for agriculture needs.

8. ORGANISATIONAL ASPECTS

The performance contract signed by SNCS and the Senegalese State specifies the main objectives of the organisation and the management of the Company. These objectives aim a global improvement of rail transport which implies increased competitiveness and the conquest of new markets.

Because of the multipurpose character and the sophistication of the tasks for which it is responsible, the existing organisation of SNCS is relatively heavy.

The accomplishment of the project should allow SNCS to derive the optimum from its networks.

9. HUMAN RESOURCES.

9.1. SNCS human resources

The total human strength of SNCS amounts to 2,065 agents distributed as follows :

113	managerial staff	
1,252	supervisory staff	
700	execution staff :	102 permanent employees
		598 temporary employees

This strength incurs an annual expense of :

4,239,000,000 C.F.A. F

distributed as follows :

managerial staff	3,514,000,000 C.F.A. F
supervisory staff	634,000,000 C.F.A. F
execution staff :	91,000,000 C.F.A. F

The 1993 budget allows 4,659,000,000 C.F.A. F for labour charges.

9.2. Human resources provided for the project

The total estimated work force amounts to 308 people (most of them coming from SNCS) and distributed as follows :

managerial staff	14
supervisory staff	36
execution staff :	258

10. PROJECT LAY OUT

The project shall be set up within the precinct of THIES shops of SNCS.

Since the shops belonging to the project are very close to one another a party wall may be required.

11. FINANCIAL ANALYSIS AND EVALUATION

The setting up of the project will involve the rehabilitation, the revamping and the modernisation the following SNCS shops located at THIES :

- Manufacturing and machining shops,
- Rolling stock shops,
- Ancillary installations and related infrastructures.

The total required investment for this project amounts to :

5.000.000,000 C.F.A. F

This amount is broken down as follows :

a). Actualised cost of existing facilities	2,360,000,000 C.F.A. F
including :	
Civil engineering & constructions	1,230,000,000 C.F.A. F
Production equipments	580,000,000 C.F.A. F
b). New investments	2,640,000,000 C.F.A. F
including :	
Civil engineering & constructions	330,000,000 C.F.A. F
Production equipments	970,000,000 C.F.A. F

Manned with 308 people, the project will perform annually as indicated hereafter :

1.- about 300,000 hours :

maintenance of 1.100 carriages and 100 passenger coaches

Production of various machined parts as sub-contracted jobs for third parties.

2.- The assembly of about 60 new carriages. (The assembly capacity could reach about 130 carriages).

3.- The manufacture of rolling tip wagons and tanks of various types.

4.- The manufacture of various simple equipments needed by the hydraulic branch and the agriculture.

This production capacity might generate a turn over of the magnitude of :

4,450,000,000 C.F.A. F

Of which :

1,200,000,000 C.F.A. F generated by the maintenance activity

3,250,000,000 C.F.A. F generated by the assembly of carriages, tip wagons and tanks and by the manufacture of components for the hydraulic activities and agriculture.

The expected profit will be :

Profit on the 5th year :

. Before taxes 982,960,000 CFA F

. After payment of taxes 638,924,000 CFA F

The assumed costs and charges are as follows :

Production costs (financial costs not included)

Thousands of C.F.A. Francs

Categories	Costs ⁽⁶⁾	%
Raw material and components	1,991,000	57.43
Fluids and energy	205,000	05.91
Labour costs	689,770	19.90
Repair and spare parts	89,820	02.59
Others	143,500	04.14
Depreciation	347,950	10.04
TOTAL	3,467,040	100.00

As far as financing is considered it has been assumed that the required amounts are to be made available as revenues from paid capital shares.

The following additional assumptions have been made :

- The cost of the existing facilities is to be paid, part on own resources and part through "participating loans at concessional rates".

- The new investment[†] is to be financed :

25% on own resources,

25% through "participating loans"

50% through a loan at the pertaining condition of the international market i.e :

interest rate 11% per annum

deferred period one year

reimbursement 16 semi annual instalments

Given these assumptions the project shows the followings achievements :

Pay-back period	five (5) years and nine (9) months
Internal rate of return	15.62%
Break-even point	51% of the program.

These results authorise the appraisal of the SNCS project as an industrial project which deserves to be considered by the Government as a national priority and on that account to be officially integrated in the investment program.

⁶ Assuming a 100% rate of operation during the fifth year.

It is to be noted that in the event of a rapid evolution towards privatisation, the payment of the investment costs ought to be aimed at a scheme based on 25% on own resources and 75% on borrowing.

12. CONCLUSION. RECOMMENDATIONS

It is unanimously recognized that the development of a given region requires the development of all forms of transport and namely of the railway transportation.

In the West Africa sub-region, SENEGAL which has openings on the Atlantic Ocean (DAKAR port namely) possesses also a basic rail infrastructure the development of which can receive impulse.

The Société Nationale de Chemins de Fer of SENEGAL, 100% state owned company, operates, manages, repairs and maintains by itself all its assets pertaining to railways.

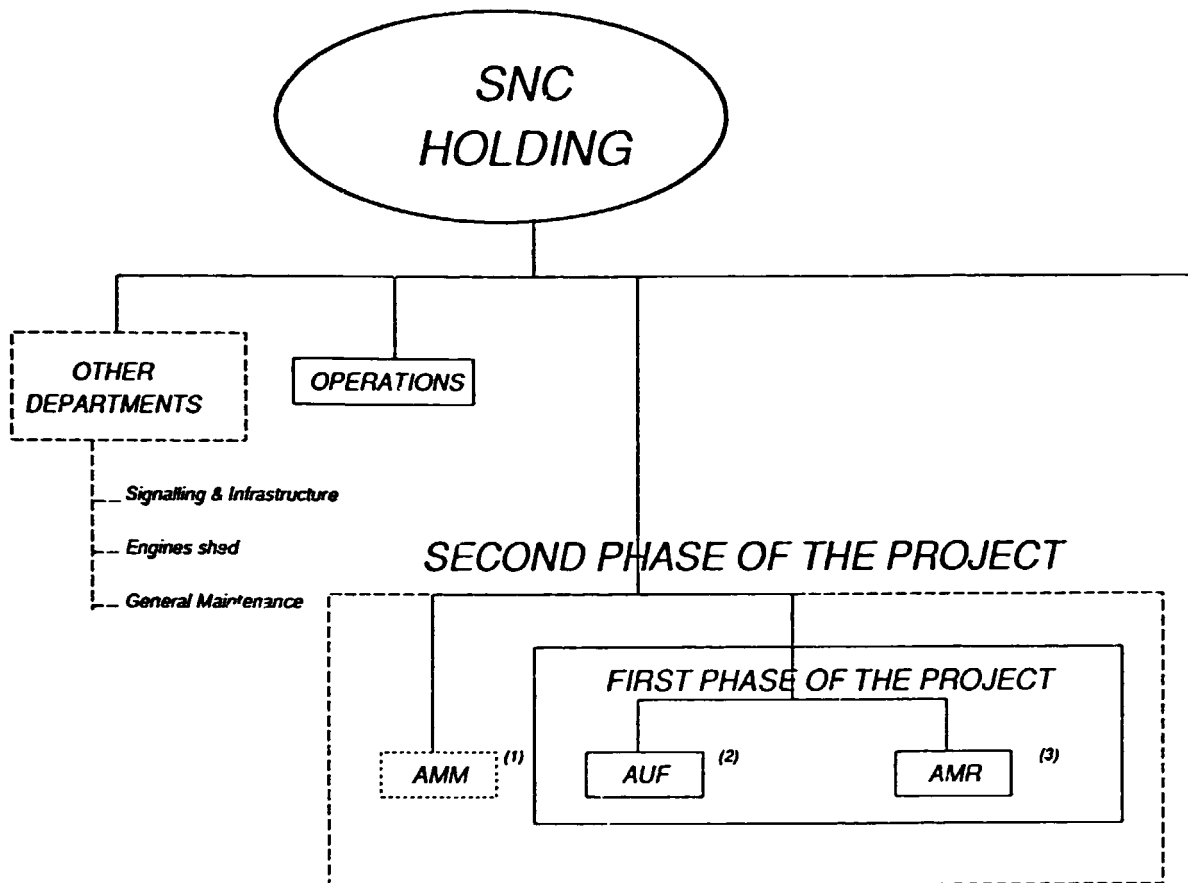
At the town THIES, SNCS has an important maintenance complex the composition and the configuration of which offer the possibility to physically set up, starting from closely located and complementary existing shops, a project for the maintenance and the manufacture of transportation equipments.

Reorganizing SNCS into two large autonomous units is a prerequisite to the achievement of this objective. The two units stemming from this reorganisation will have the following missions and roles :

- The operation of the railway network, the rolling stock and towed vehicles in the framework of passengers and freight transport activities,
- The repair and maintenance of equipment pertaining to railways, the assembly of carriages, the manufacture of tip wagons, tanks and various equipment, tools and accessories needed by various clients (hydraulic branch and agriculture).

The results of the study show that this project is of major importance from both the domestic and the sub-regional point of views. Therefore it deserves being considered by the Government as a priority and to be officially integrated within the development program.

13. PROPOSAL FOR THE REORGANIZATION OF SNCS.



- (1) Rolling power units shops
- (2) Manufacture and machining shops
- (3) Rolling stock shops