HUNDRED AND TWENTY-SECOND REPORT

PUBLIC ACCOUNTS COMMITTEE (1987-88)

(EIGHTH LOK SABHA)

BOXN WAGONS

MINISTRY OF RAILWAYS
(RAILWAY BOARD)

Presented in Lok Sabha on 18-4-1988
Laid in Rajya Sabha on 25-4-1988

LOK SABHA SECRETARIAT
NEW DELHI

April, 1988/Chaitra, 1910 (Saka)
Price : Rs. 13·00

CONTENTS

Abbreviations Used

RDSO	—	Research, Designs and Standards Organisation.
UTS	—	Ultimate tensile strength.
MT	—	Million tonne.

*Not printed. Five copies placed in Parliament Library.

COMPOSITION OF THE PUBLIC ACCOUNTS COMMITTEE (1987-88)

CHAIRMAN

Sari Amal Datta

MEMBERS

Lok Sabha

2. Shri S.M. Bhattam
3. Shri Mohd. Ayub Khan
4. Shri Y.S. Mahajan
5. Shri Ajay Mushran
6. Shri K. Ramamurthy
7. Shri Balwant Singh Ramoowalia
8. Shri Navinchandra Ravani
9. Shri S. Jaipal Reddy
10. Shri Chiranji Lal Sharma
11. Shri Pratap Bhanu Sharma
12. Genl. R.S. Sparrow
13. Dr. Chandra Shekhar Tripathi
14. Shri Vir Sen
15. Shri Yogeshwar Prasad Yogesh

Rajya Sabha

16. Shri A.K. Antony
*17. Shri Nirmal Chatterjee
*18. Shri Bhuvnesh Chaturvedi
19. Sari M.S. Gurupadaswamy
20. Shrimati Manorama Pandey
21. Shri B. Satyanarayan Reddy
22. Shri T. Chandrasekhar Reddy

SECRETARIAT

1. Shri K.H. Chhaya—*Joint Secretary*
2. Shri B. D. Duggal—*Chief Financial Committee Officer*
3. Shri S.M. Mehta—*Senior Financial Committee Officer.*

*Ceased to be members of the Committee consequent on their retirement from Rajya Sabha w.e.f. 2 April, 1988.

INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf this Hundred and Twenty-Second Report on paragraph 8 of the Report of the Comptroller and Auditor General of India for the year 1984-85, Union Government (Railways) on BOXN Wagons.

2. The Report of the Comptroller and Auditor General of India for the year 1984-85, Union Government (Railways) was laid in Lok Sabha on 8 May, 1986.

3. The Committee in this Report have noted that as long back as in March 1973 the RDSO had suggested that the inside body height of the wagon should range between 1950 mm to 2000 mm. It took 7 long years by the Railway Board and RDSO to finally approve the design. No satisfactory explanation has been given to the Committee for delay of this magnitude. This appears all the more strange in view of the sense of urgency displayed for getting this wagon manufactured and deployed during the Sixth Plan period. The Committee have deprecated inordinate delay in the approval of the design and have cautioned the Government to guard against such delays in future. The Committee have pointed out that the procedure, practice, and methodology involved in such a research and development project require critical analysis and review followed by laying down of norms necessary to obviate any delay not to speak of such inordinate delay as occurred in this case.

4. Whenever a new rolling stock is decided upon the prototype has to be subjected to a number of tests such as oscillation trials, impact tests squeeze load test, rolling resistance trials and braking distance tests in the field. These tests are considered essential before the wagon is cleared for heavy freight operation. In January, 1978, the Ministry of Railways (Railway Board) decided that a study of the behaviour of prototype wagons and techno-economic study should be undertaken before commencement of bulk production. The Committee have, however, been constrained to note that the Ministry of Railways (Railway Board) placed orders on wagon builders in July 1982 committing the Government to a sum of Rs. 656 crores on procurement of wagons of a new design without having its performance evaluated by RDSO. The commitment was made in utter disregard of an earlier decision taken in January 1978 regarding carrying out of the tests mentioned above. In the opinion of the Committee it was most imprudent on the part of the Railway Board to have placed order for wagons without necessary trials and gaining service experience. It is all the more regrettable that even detailed reasons leading to this decision were not recorded in writing.

Expressing their dismay over this highly unsatisfactory state of affairs in a project of such a huge magnitude the Committee have observed that the very fact that the Railway Board is now on the search for a modern freight bogie(s) best suited to the Indian Railways is indicative of the fact that their earlier decision was taken in undue haste and was erroneous and unsound. The Committee have expressed the hope that the Government would draw a lesson from this experience and will launch such projects in future only after taking adequate care and precautions in long term interests of the economy.

5. The Research, Designs and Standards Organisation (RDSO), an institution under the Ministry of Railways, carries out research, development and standardisation work in all the disciplines in the Railways. It also keeps the Indian Railways upto date in technical know-how relating to world-wide railway-oriented development and technology changes. To keep pace with the fast moving changes in science and technology scenario in the world and to achieve self-reliance in Railway requirement, it is imperative that detailed knowledge of the latest developments in technology in the railway-related fields is acquired by RDSO and applied to the Indian Railways not only through technological quantum jumps but wherever possible through continuous incremental improvements. The Committee have recommended that the Ministry of Railways (Railway Board) should appreciate the further facilities needed and competence required to be built up and take suitable and expeditious steps to revamp and restructure RDSO so as to undertake upgradation of technology in consonance with the changes that are taking place elsewhere in the world. They have also recommended that RDSO be so organised as it will be able to absorb at faster pace technologies relevant to the needs of the Indian Railways.

6. The Committee have further recommended that a perspective plan for research and development be drawn up for the next 10-15 years which should be reviewed every year in the light of performance and demand projections. RDSO should keep on examining and evaluating the existing state-of-art technology and direction of future technology developments in various disciplines of Railways perseveringly on a long term basis especially in production areas involving substantial investments of financial resources and a large volume of production.

7. The Committee are unhappy over the manner in which the Ministry of Railways (Railway Board) have proceeded in the matter for production/ replacement of heavier rails of 90 UTS variety. In order to achieve higher speed potential of BOXN wagons in loaded condition and check in the rise of the incidences of rail tear and wheel wear due to CASNUB bogies fitted under BOXN wagon, instructions have been issued that priorities may be accorded to use of heavier 90 UTS rails on high density routes and BOXN routes. Consequent on the introduction of BOXN wagons in October, 1982, and its acquisition year by year, BG open wagon fleet

composes of about 25% BOXN wagons at present (1987) whereas replacement of existing rails by those of requisite standard is painfully slow, even though such replacement was recommended more than ten years back. Only K.K. Line (445 km.) has been relaid with new rails of 90 UTS.

Track was already overdue for replacement and there is a limit beyond which the rails cannot be allowed to wear out without jeopardising safety. Most of the Railway systems abroad have already adopted heavier rail sections with higher UTS of 90 kg/mm sq. which are wear resistant and have longer service life. As the track modernisation programme involves substantial investment of financial resources and a large volume of production, the Committee consider that renewal of track should be straight away done with rails of 60 kg/m section with 90 UTS variety. This will not only ensure general reliability and improve productivity of the Railway system but will be also vital to safety and long-term economy.

8. The Public Accounts Committee (1986-87) examined this Paragraph at their sittings held on 16 and 29 December, 1986. The Public Accounts Committee (1987-88) examined the Paragraph at their sitting held on 19 August, 1987.The Committee considered and finalised this Report at their sitting held on 28 March, 1988. The Minutes* of the sittings form Part II of the Report.

9. For reference facility and convenience, the observations and recommendations of the Committee have also been reproduced in a consolidated form in Appendix III to the Report.

10. The Committee place on record their appreciation of the commendable work done by the Public Accounts Committee (1986-87) in obtaining information for the Report.

11. The Committee would like to express their thanks to the officers of the Ministries of Railways (Railway Board), Steel and Mines (Department of Steel), Energy (Departments of Coal and Power) and others for the cooperation extended by them in giving information to the Committee.

12. The Committee also place on record their appreciation of the assistance rendered to them in the matter by the Office of the Comptroller and Auditor General of India.

AMAL DATTA,
Chairman,
Public Accounts Committee.

NEW DELHI;
7 *April*, 1988
18 *Chaitra*, 1910 (*Saka*)

*Not printed. Five copies placed in Parliament Library.

REPORT

BOXN WAGONS

CHAPTER I

BACKGROUND

1.1 The Audit Paragraph 8 on BOXN Wagons as appearing in the Report of the C & AG of India for the year 1984-85, Union Government (Railways) is reproduced as Appendix I to this Report.

1.2 The BOX wagon was introduced on the Indian Railways in the early sixties. These BOX (earlier called BOX 'C') wagons were able to allow track loading density of 5.97 tonnes per track metre which was equivalent to trailing load of 3414 tonnes gross. This wagon served as the main stay for moving bulk traffic on the Indian Railways till the early 80s and are still in extensive use.* The Ministry of Railways (Railway Board) had, however, felt the need for improvements in critical areas—such as frame cracks and failure of laminated bearing springs, as these according to the Railways these were resulting in wagon breakdown en-route compelling the Railways to detach the wagon from the rake, entailing loss of time and as such lower quantity of freight.

1.3 In the Corporate Plan for the Indian Railways, (Initial version dated December, 1973) which covered the Fifth, Sixth and Seventh Plan periods the volume of goods traffic had been broadly assessed as about 310 billion net tonne kms. (450 million tonnes originating) by 1988-89, as compared with 147 billion net tonne kms. in 1973-74.

According to the Corporate Plan the share of bulk commodities, viz. coal, iron and steel, ores, stones, cement, fertilizer and mineral oils which formed 58 per cent of the total revenue earning tonnage on Railways in 1950-51 and had increased to 80 per cent in 1973, was likely to reach a higher level of 85—90 per cent by 1988-89.

1.4 Forecast of freight traffic, according to Corporate Plan of the Indian Railways (1976) was as follows :

(Figures in Million Tonnes)

	1975-76	1978-79	1983-84	1988-89
Coal :	80·5	92	120	155
Total :	222·0 (148 billion NTKms.)	255·5 (172 billion NTKms.)	310 (205-210 billion NTKms.)	370 (235-240 billion NTKms.)

*As on 31-3-1987 out of the 1,55,750 total number of special type wagons in term of 4 wheelers Box 'C' wagons constituted 50747 number against 13263 nos. BOXN wagons.

1.5 The total movement of coal was expected to be of the order of 68 billion net tonne kms. in 1978-79 and 88 billion net tonne kms. in 1988-89 as against 28 billion net tonne kms. in 1970-71. Thus, nearly 30 per cent of the total freight increment would constitute coal traffic.

1.6 In 1972-73*, the traffic was of the order of 201 million tonnes. At that point of time, there was a feeling that the loading would be increased to a great extent. As per the projections of the Planning Commission, the traffic was expected to grow from 220 million tonnes in 1980-81 to 309 million tonnes at the end of Sixth Plan, i.e. an increase of nearly 80 million tonnes in a period of just five years. To cope with the increase, the Railways felt the need for a different sort of wagon with more capacity within the existing track structure and loop length of 686 metres so that the same train would be able to carry more load. The only ways by which increase in bulk traffic could be handled without adding extra investment in infrastructure was with increased unit loads and higher average speed of goods trains. A new wagon design was considered so that rakes could take loads upto 4500 tonnes within the existing loops of 686 metres length and within the permissible track loading density of 7.67 tonnes per metre.

According to the Railways the main defect of the Box Wagon was spring breakages in service necessitating detachment of wagons en-route. They have laminated springs, with plates placed one on the top of the other—in primary suspension i.e. spring between the wheel and the wagon. It has the benefit of low wheel wear and low rail tear. But it has a disadvantage; namely, if the spring breaks, the wagon has to be detached. Due to overloading, which was possible due to excess space in the wagon relative to permissible loading the spring breakages were high. In the new wagon the Railways wanted to get rid of these difficulties including the possibility of overloading and simultaneously utilise the availability of strength of the track to the fullest extent. So with this new design, the Railways were not to make investment in the line capacity but in the alternative on wagons. It was necessary to build and acquire a least failure wagon.

Development of the design

1.7 The Railway Board directed the Research, Design and Standard Organisation (RDSO) in September, 1972 to design a new wagon with 20.3 tonne axle load and features similar to existing Box wagons but which should be of shorter length. Such a wagon utilising the advantage of height should be able to achieve a track loading as close as possible to the maximum permissible limit of 7.67 t/m (tonne per track metre), thereby increasing the throughput within the existing track structure and loop lengths.

*According to the Chairman, Railway Board during evidence on 19-8-1987.

The RDSO proposed three designs in March 1973 with inside body heights of 1950 mm, 2000 mm and 2460 mm. The project report submitted by RDSO in September 1974 recommending a new design with an inside height of 2000 mm was considered by the Railway Board in March 1975 and approval for detailed design work for a wagon with 2460 mm inside body height was given. The RDSO completed the design in November, 1977. In January 1978, the Railway Board approved the manufacture of 10 prototype wagons and decided that after the behaviour of the wagon was studied series production to complete one rake of 4500 tonne train would be taken up with the approval of the Railway Board. In March 1979 the Railway Board placed orders for manufacture of 105 wagons for constituting two rakes for service trials. These two rakes were to be of different bogie designs for comperative evaluation performance. The trials on prototype wagon were completed in September 1980. Meanwhile, the Railway Board and RDSO reviewed in July 1980 the design parameters and once again reverted to an inside height of 1950 mm as originally planned.

1.8 The Committee note that as long back as in March 1973 the RDSO had suggested that the inside body height of the wagon should range between 1950 mm to 2000 mm. It took 7 long years by the Railway Board and RDSO to finally approve the design. No satisfactory explanation has been given to the Committee for delay of this magnitude. This appears all the more strange in view of the sense of urgency displayed regarding manufacture and deployment of this wagon during the Sixth Plan period. The Committee deprecate inordinate delay in the approval of the design and would caution the Government to guard against such delays in future. The procedure, practice, and methodology involved in such a research and development project require critical analysis and review followed by laying down of norms necessary to obviate any delay not to speak of such inordinate delay as occurred in this case.

CHAPTER II

DESIGN AND PARAMETERS

Test and Trials

2·1 Whenever a new rolling stock is decided upon the prototype has to be subjected to a large number of tests and trials before it is cleared for general operation. In the case of BOXN wagon it was decided to subject it to the following tests and trials :

(i) Oscillation trials

(ii) Impact tests/squeeze load test

(iii) Rolling resistance trials

(iv) Braking distance tests in the field.

These tests were considered essential to clear the wagon for heavy freight operation.

2·2 According to the Ministry of Railways (Railway Board) for wagon designs, developed on proven sub-system, whose technical and commercial advantages can be readily visualised, no elaborate studies are considered necessary; and minimal mandatory tests like oscillation tests are considered adequate in view of RDSO's 'proven' expertise in this field.

2·3 It was also intimated by the Railways that oscillation trials were conducted from November 1979 to February 1980 to study, the behaviour of the wagon.

(i) Based on the above test RDSO speed certificate of November 1981 stipulated the following maximum speeds for BOXN wagons.

(a) *Loaded condition*

(i) On sections permitting 100 kmph passenger operations—80 kmph.

(ii) Other sections—75 kmph.

(b) *Empty condition*

(i) On sections permitting 100 kmph passenger operations—80 kmph.

(ii) Other sections—75 kmph.

(ii) The rolling resistance trials and braking distance trials were not conducted in 1979-80 because, for this purpose, a full rake was essential which was not available then. Impact tests were not considered necessary by the Railways on the ground that the BOXN wagon was designed on the same principles as the BOX wagon but, being shorter, was sturdier than the BOX wagon.

2.4 The Committee find from the Audit Para that the earlier decisions taken by the Railway Board in January 1978, *viz.*, that a study of the behaviour of prototype wagons and techno-economic study should be undertaken before commencement of series production was not given effect to and bulk orders for BOXN wagons were placed by the Railway Board in July 1982 for 16400 BOXN wagons committing the Government to an investment of Rs. 656 crores before the new design had been evaluated for technical and commercial acceptance.

2.5 According to Railways the Sixth Five Year Plan (1980—85) projected an originating traffic of about 309 million tonnes in 1984-85 against the 220 million tonnes actually lifted in 1980-81. To meet this challenge, the major task before the Railways was, therefore, to substantially increase throughput with minimal inputs in infrastructure. This meant increasing the throughput per rake within the limitations of the existing loop length and track structure. The BOXN wagon which enabled trailing load of 4500 gross tonnes in the existing loop length (as against 3600 gross tonnes possible with a BOX rake) offered a viable solution. It was broughtout by the Railways that the anticipated increase in traffic particularly coal traffic on saturated routes made it urgent that Indian Railways must acquire BOXN wagons in large numbers. The Railway Board accordingly took a decision in 1982, without waiting for detailed techno-economic studies, to order series production of BOXN wagons so that a sizeable fleet became available within a quick time-frame to meet the projected traffic.

2.6 During evidence the then Chairman, Railway Board stated that greater throughput which was partly because of grater reliability were the main reasons for placing bulk orders on trade for manufacture of BOXN wagons before completing the trial tests. Accroding to him because of serious bottlenecks the Railways were not able to move the traffic, particularly coal, and it was felt that any more delay would result in huge losses and it was accordingly decided to dispense with the tests. It was also explained during evidence that the Railways had become also the bottleneck in the economy of the country and would bring it down to shambles. The Committee enquired as to why these reasons had not been recorded as according to the Committee it was necessary to record the reasons so that the successive Board or the successor would know the reasons as to why such a commitment was made. The then Chairman, Railway Board stated during evidence "you are right the reasons could have been recorded as fully as possible, sometimes, some dynamic people go ahead without it."

In July 1982 itself the RDSO had advised that the main trials contemplated were necessary as the BOXN was a new design wagon featuring a number of major design changes e.g. use of cartridge type of bearings, twin pipe airbrake system, cast steel bogies etc. and there was no data available with RDSO about basic performance characteristics of these wagons.

2.7 The Committee are constrained to note that the Ministry of Railways (Railway Board) placed orders on wagons builders in July 1982 committing the Government to a sum of Rs. 656 crores on procurement of wagons of a new design whose performance had not been evaluated by RDSO in utter disregard of an earlier decision taken in January 1978 by the Railway Board that a study of the behaviour of prototype wagons and techno-economic study should be undertaken before commencement of bulk production. In the opinion of the Committee it was most imprudent on the part of the Railway Board to have placed order for wagons without necessary trials and gaining service experience. It is all the more regrettable that even detailed reasons leading to this decision were not recorded in writing. The Committee cannot but strongly express their dismay over this highly unsatisfactory state of affairs in a project of such huge magnitude. What is further disquieting is that the Railways placed order on wagon builders totally disregarding the advice of the RDSO. The Committee deprecate that a matter involving huge expenditure of Rs. 656 crores was handled in such a casual manner and would like the Government to draw a lesson from this sad experience and ensure that such serious lapses do not recur in future.

Design Parameters

2.8 The design parameters of BOXN wagon as laid down, in the Project Report were :

(1) Speed potential of 100 kmph;

(2) Trailing tonnage of 4500 t per train whilst keeping within the maximum permissible track loading density of 7.67 t/m (tonne per track metre);

(3) Suitable continuous brake systems for controlling such wagons and providing adequate brake power for trains of 4500 t;

(4) 20.3 t axle load with roller bearings to make them suitable for operation on all routes on which existing BOX wagons were permitted; and

(5) Capability to work on 7,500 t trains.

According to the Ministry of Railways all the above parameters have been met except speed. With the provision of constant contact side bearers, it was expected to reach 100 kmph but such speed could be attained only after upgradation of the track structure which, *inter alia* include provision of 60 kg. rails, continuously welded.

2.9 During evidence it was stated by the then Chairman, Railway Board that the maximum permissible speed of 90 kmph had not yet been achieved and that efforts were still on and that with air brakes and other modern techniques the average speed had gone up.

2·10 As regards the materialisation of anticipation about load the Ministry of Railways (Railway Board) stated that BOXN wagons are suitable for hauling 7500 tonnes trailing loads with provision of high capacity couplers and twin-pipe graduable release air brake system. The latter system is now the standard for all air-braked stock. The M/O Railways (Railway Board) have further stated that indigenous capacity for high capacity couplers is being progressively increased to cover all new built wagons trains of 9000 t trailing load are now being regularly hauled in Mughal Sarai-Ghaziabad Section as per details given below. No change in the bogie was involved.

Month	No. of 9000 tonne trains run
February, 1986	14
March, 1986	14
April, 1986	28
May, 1986	26
June, 1986	24
July, 1986	35
August, 1986	27
May, 1987	38
June, 1987	35
July, 1987	27

Choice of Bogie, Axles and Bearings

2·11 The Committee find from the Audit Report that the design finally adopted required use of (a) 22·9 tonne axle load casnub cast steel bogie (though the axle load has to be kept limited to 20·3 tonnes), (b) 22·9 tonne capacity axles and wheel sets, (c) cartridge tapered roller bearings, (d) twin pipe air brakes, and (e) high tensile couplers and draft gears. Though from first cost considerations the choice of casnub bogie, 22·9 tonne wheelsets etc., were expensive, their choice was determined on the consideration that the design features besides enabling haulage of heavier trains would ensure a 'Zero defect' wagon in the sense that apart from eliminating the need for detachment en route, the wagon would require very little maintenance effort. The Railway Board also explained that 22·9 tonne casnub bogie was adopted for reasons of standardisation and inter-changeability and for providing a built in reserve. The axle load has, however, got to be restricted to 20·3 tonnes on account of limits to track loading density.

Spring failure in UIC Bogies

2·12 It was brought out by the Railways during evidence that the BOX wagon incorporated the fabricated UIC bogie with laminated bearing spring

in primary suspension. One of the reasons for breakage of springs is overloading. Due to more volumetric capacity in BOX wagon, overloading of BOX wagon is not only possible but is done more often than not. The BOX wagon was not supposed to be loaded upto the brim but only upto loading line about one metre below the brim when loaded with coal when filled upto that level 56 to 57 tonnes of coal can be loaded leaving a portion of the BOX wagon empty at the top. On the other hand the BOXN is to be loaded slightly short of the brim.

2·13* It was also explained that the spring testing is done at the time of periodical overhaul once in 4½ years. According to the Railway Manual, compulsory scrag testing of springs during ICH has been there since early Sixties. Every single spring is required to be scrag tested, that is, given full load to make it flat three times in quick succession. At the end of it, the camber is measured. If the camber is correct, the spring goes back. It was also explained that in case of loaded wagons if the camber is right, the load is correct. Every BOX wagon is required to be intensively examined as per rules before leaving for an outward journey. There are preventive maintenance schedules, namely, once in eighteen months, for bogie check, repair, and greasing, etc.

2·14** It was further explained that the Railways have got 5,60,000 springs. Therefore, if scrag testing is to be done every 18 months. Railway will be doing tests on 700 springs a day against the present figures of only 240. While it is easy to do the test in the initial stage, in the case of wagon, it is not so easily done. Equipment for doing a load deflection test on a spring is available. But according to the Ministry of Railways (Railway Board) such test takes a long time and is not commensurate with the return. The Ministry of Railways (Railway Board) claim that the preventive maintenance and periodic testing practice which they are following is in line with good practice all over the world, and that nobody does spring testing outside the workshop. They maintained that more frequent scrag testing of springs would not prevent spring failure on road. It was also intimated that the Railways did not change the Manual to provide for frequent testing and preventive maintenance when they found that these spring breakages were giving them trouble and causing detachments en route.

2·15 In a note the Ministry of Railways (Railway Board) explained the changes effected in laminated bearing springs to reduce the incidence of this failure in serivce of BOX wagons as follows :

(i) Based on IR's experience with standard laminated springs on 4-wheelers wagons, 10-plated springs were finally adopted for the

*Information given during Evidence by representatives of Railway Board on 19-8-1987.

**Information given during evidence before PAC on 19-8-1987.

IR version of the UIC type bogie, fitted under BOX/BCX/BRH wagons.

(ii) However, in actual practice, the UIC bogies under BOX/BCX/BRH wagons had to work under conditions much more arduous than in Europe in terms of track geometry and overloading. Thus, even with 10-plates, the failure rate of the springs was high.

(iii) Therefore, the only areas where improvements could be effected were :

(a) upgradation of raw material for springs;

(b) improvements in manufacturing and repair practices of springs.

(iv) In addition to the aforesaid measures, RDSO has also evolved an improved design of the spring with the second plate wrapped over the top plate. This is in a bid to reduce breakage of the top plate which constitutes the single largest cause for spring failures in Service.

(v) The Indian Railways are also planning to procure parabolic springs developed by European Railways for use on their wagon stock and indigenise manufacture in due course.

Rail Fractures and Rail Wear Due to Use of BOXN Wagons Rail Fractures

2·16 The Committee have been informed by the Railway Board that higher creep and lateral wear have been experienced on the existing track structure, specially on curves, where BOXN wagons are being deployed. The details of rail fractures on routes where BOXN wagons were deployed are as under :

		1982-83	1983-84	1984-85
Southern Rly. . . .	Empty	30	23	46
	Loaded	25	32	68
		1982	1983	1984
Central Rly. . . .	Empty	15	16	8
	Loaded	49	62	72
Western Rly. . . .		90R	52 Kg.	
	1982	172	4	
	1983	187	5	
	1984	321	3	
	1985	394	9	
	1985-86	238	7	

It was also explained that there is an increase in the rail fractures on sections where BOXN loaded wagons are running. However, it has not been possible for the Railways to attribute the increase in the rail fractures entirely to the running of BOX 'N' wagons on the route, as according to them other factors like increased fatigue due to increase in traffic density also contribute to the same.

As regards rail wear, the observations made on Umaria-Katni section on South Eastern Railway where the track consists of 52 kg. rails laid in 1980-81 and which has carried 86 GMT so far, indicate that the maximum extent of rail wear on inner rail of sharp curves of 3° and above was to the extent of 5·5 mm. vertical wear and the lateral wear on outer rail was to the extent of 14 mm.

Wheel Wear

2·17 According to the Railway Board the first lot of BOXN wagons were put into use on K.K. line where they earned about 13,000 to 17,000 kms. When these were thereafter transferred for use in the CIC area, sharp flanges on the wheels of these wagons were reported in 1983-84.

Wheel flange wear was recorded on 95 BOXN wagons at Mughalsarai in the third week of June 1987 by RDSO.

The population included BOXN wagons of varying lengths of service, with and without elastomeric pads.

2·18 It was also stated by the Railway Board that elastomeric pads have been introduced on the CASNUB bogie. A survey conducted by the RDSO on the performance of these modified bogie indicated an improvement of about 50% in reduction of wheel wear as compared to the unmodified CASNUB bogie. Elastomeric pads can be retro-fitted on all CASNUB Bogies.

Also instructions have been issued that on routes where BOX 'N' rakes are operating, Railways should preferably use 90 UTS rails.

2·19 According to the Railways, a comparative study of incidence of wheel wear and rail fractures on tracks where BOXN wagons are being run and where there is no running of BOXN wagons is neither feasible as the physical features vary from section to section with regard to alignment, gradient, type of traffic, GMT and track structure, nor is it possible to isolate the sections where BOXN wagons will be exclusively running and there will be no mix of rolling stock. It was also brought out that the RDSO is going to have in next 2-3 years time, a test track where it may be possible to undertake research activity to identify the effects of running of a particular stock on the track.

Performance

2·20 During the course of Audit scrutiny the performance of BOXN wagons during the three years upto July 1985 showed that incidence of sick marking was on an average 4·6 wagons per trip as against 1 to 1·5 wagon per trip as contemplated. The design also revealed several adverse features. These were-abnormal wheel flange wear requiring more frequent turning; high wear on wedges; breakages of snubber and load bearing springs; fracture of centre pivot and spring planks; and brake beams bent/broken.

2·21 The Ministry of Railways have submitted that teething troubles were experienced in the areas of brake beam, spring plank, centre pivots and wedges. These have since been modified.

2·22 It was brought out during evidence that the position regarding frequency of routine overhaul on BOXN was reviewed in March 1986 by the RDSO, Lucknow. Based upon the actual wear and tear of the components an interval of 18 months has now been fixed and necessary instructions issued to the Railways in March, 1986.

2·23 It was also gathered from information that the standard practice on Railways was to work out sick percentage in relation to the total holdings. On this basis the sickness of BOXN wagons expressed as percentage of the total holdings of BOXN wagons per day was in the range of 0·65 per cent and that was less than one-third of the figure for the BOX wagon (including ineffectives for POH). Detachments enroute on the BOXN Wagon are only 0·033% again significantly less than those of the BOX wagon.

2·24 The experience with the CASNUB bogies on the Indian Railways highlighted the need for (a) instituting further improvements on these bogies, and (b) instituting a research for latest bogie design (s), which would combine to the maximum extent possible, the virtues of the UIC and the CASNUB bogies.

In pursuance of Railway's research for a modern wagon bogie to meet its future requirement, a global tender was floated. After evaluating the various offers received against the global tender, the 19 numbers each of 9 types of bogies by a large, covering the broad range of latest modern freight bogie designs available in the world are being imported for detailed perfomance evaluation to select the bogie(s) best suited to Indian Railways and to obtain technical know-how for establishing indigenous manufacture.

2·25 According to the Railways the decision taken in 1982 to order series production of BOXN wagons without waiting for the results of prototype trials and detailed techno-economic study was vindicated by subsequent achievements in traffic lifted. Sadly enough, experience of working of BOXN wagons has

belied the expectations in regard to technical superiority of the design as has been discussed in the succeeding paragraphs :

(a) After evaluation of the results the wagon was cleared in November 1981 for a speed of 75 kmph on track laid with 90 lb. rails. This was far below the design parameter of 90 kmph laid down by the Railway Board in January 1981. Even after further trials in April 1982 on better maintained track the wagon was cleared for 90 kmph in empty conditions only and it was found that in loaded condition it was not possible to permit a speed of over 75 kmph.

(b) There is an increase in the rail fractures on sections where BOXN loaded wagons are running even though it has not been possible to attribute the increase in the rail fractures entirely to the running of BOXN wagons on the route,

(c) In addition, para 2·33 of the Project Report on BOXN wagon specifically mentions that prototype testing and trials of the wagons to be produced will have to be comparatively more exhaustive as these would be a new concept, not tried out on Indian Railways before.

(d) The incidence of defects in bogies, air brakes, wheels etc. was very high on account of design deficiencies (bogies) poor quality supplies which did not lend themselves to simple solution.

(e) The wheel wear observed on the CASNUB bogie is higher than that of the UIC bogie. In July 1984, RDSO concluded that the wheel wear rate in case of BOXN wagon with CASNUB bogie would be twice as high than in the case of BOX wagon.

(f) The very fact that the Ministry of Railways have now decided to float a global tender for a modern bogie best suited to Indian conditions to meet its future traffic requirements is clearly indicative of imprudence in planning and implementation of a project of such a great importance and vast magnitude.

2·26 The Committee is of the opinion that it was not prudent on the part of the Railway Board to have ordered bulk production of BOXN wagons without knoing the complete results of all prototype trials. While endeavouring to achieve immediate and short-term objectives the Government lost sight of the long-term perspective. The Committee fails to understand how the Railway Board decided on standardisation of CASNUB bogie before its performance was tried out under the conditions in our country. The very fact that the Railway Board is now on the search for a different type of bogie (22·3 taxle load) is indicative of the fact that their earlier decision was taken in haste and was erroneous and unsound. The Committee have no doubt that all these factors are such as could have been monitored and controlled had the Government

not acted in undue haste but had taken decision only after considering in depth the full implications of issues involved in long-term interests of the economy. The Committee is constrained to comment that such hasty action became necessary only because the Railways had not moved expeditiously in finalizing, trying and approving the design of new wagon in the earlier years and had allowed a long time to pass through procrastination and lack of sense of urgency. The Committee hope that the Government would draw a lesson from this experience and will organise such future projects after taking adequate care and precautions. The Committee note that efforts are on to improve the performance of CASNUB bogie by carrying out modifications and also to improve the speed potential of the wagon. The Committee would like to urge that the Railway Board should monitor closely these efforts by RDSO in this direction. The Committee would like to be apprised of further developments in this regard.

2·27 The Research, Designs and Standards Organisation (RDSO), an institution under the Ministry of Railways, carries out research, development and standardisation work in all the disciplines in the Railways. It also keeps the Indian Railways up-to-date in technical know-how relating to world-wide railway-oriented development and technology changes. The Committee is of the view that to keep pace with the fast moving changes in Science and Technology scenario in the world it is imperative that detailed knowledge of the latest developments in technology in the railway-related fields is acquired by RDSO and applied to the Indian Railways not only through technological quantum jumps but wherever possible through continuous incremental improvements. The Committee also desire that the RDSO should be equipped for up-to-date design activities and acquire the latest testing facilities on a short time bound programme.

2·28 In order to have a proper appraisal of long-term wear and tear effects due to fatigue, corrosion, etc. of track and vehicle systems the Study Group during their visit to RDSO, Lucknow was informed that a test track associated with a FAST Loop (Facility for Accelerated Service Testing) was being set-up at Mughalsarai and it was expected to be available within a span of about a year or so, It is indeed a sad commentary on the Railways R & D that it has still now no exclusive test track without which no proper research of the vital features of the behaviour of railway vehicles and rail lines can possibly be carried out. The Committee recommend that the Ministry of Railways (Railway Board) should appreciate the further facilities needed and competence required to be built up and take suitable and expeditious steps to revamp and restructure RDSO so as to undertake upgradation of technology in consonance with the changes that are taking place elsewhere in the world; that RDSO be so organised that it will be able to absorb at faster pace technologies relevant to the needs of the Indian Railways and apply the relevant technology with competence and confidence and thereby minimise the dependance of Railway on foreign sources for supply of essential raw materials and components,

2·29 The Committee are of the opinion that a perspective plan for research and development be drawn up for the next 10-15 years which should be reviewed every year in the light of performance and demand projections. It is imperative that serious and concerted efforts are made to acquire the latest technology from advanced countries, achieve breakthrough in know-how whenever necessary and to develop indigenous items at a faster pace so that self-reliance in Railway requirement is achieved expeditiously. Every effort should be made to ensure that time and money are not wasted on uncertain or obsolete technologies as has taken place in this case of BOXN wagons. RDSO should keep on examining and evaluating the existing state-of-art technology and direction of future technology developments in various disciplines of Railways on a long-term basis especially in production areas involving substantial investments of financial resources and a large volume of production.

2·30 The Railways have pointed out that there were a number of causes for the failure of UIC bogies under Box wagons. The spring breakages has been attributed as the main cause leading to detachment of the wagon enroute. It is primarily due to very high overloading of BOX wagons upto 10–12 tonnes of excess loading. Box wagon has more volumetric capacity of 68·59 cu.m. Since Box wagon was meant to carry a variety of bulk commodities, it was not supposed to be filled with each and every commodity upto brim level. For heavier commodities, the top level would have to be kept lower than the brim depending upon the density of the item. For instance in case of coal, there is loading line about one metre below the brim upto which 56 to 57 tonnes of coal can be loaded within permissible limits. With availability of more volumetric capacity, the overloading was more liberal in Box wagons. The Committee recommend that the Railways should review norms for commodity-wise loading in Box wagons upto certain level and enforce them strictly so as to reduce incidences of spring breakages on account of over-loading.

2·31 The Committee note that compulsory scrag testing of springs is done during overhaul of BOX wagon once in $4\frac{1}{2}$ years. The preventive maintenance and periodic scrag testing the Indian Railways have adopted its based on practice of the Railway systems abroad. Since UIC bogies under BOX/BCX/BRH wagons employing laminated bearing springs, have to work under conditions much more arduous than in other countries in terms of track geometry and liberal overloading, the failure rate of the springs is high on the Indian Railway. The Committee note that the Railways did not change the Manual to provide for frequent scrag testing and preventive maintenance. The Committee suggest that norms for preventive maintenance and periodic overhaul should be reviewed so as to make such norms more appropriate under conditions obtaining in India and ensure that through their strict observance the wagons remain in proper working conditions.

CHAPTER III

HEAVIER UTS RAILS

3·1 The position as intimated by the Railway Board with regard to adoption of 60 kg. per metre rails on Indian Railways and its development by Bhilai Steel Plant is as under :

(1) As per RDSO project report on the design of new BOXN type wagons for increase in throughput published in September, 1974, it has been recommended that BOXN wagons may be permitted to run upto a maximum speed of 75 Km/hr on a track structure consisting of 90 R rails with M+4 sleeper density and 200 mm ballast cushion. On track structure consisting of 52 kg. rails with M+7 sleeper density and 250 mm ballast cushion, speed upto 80 km/hr may be permitted on Rajdhani route. 60 kg per metre rails were specified for speed of 100 km/hr.

(2) The specifications for 60 kg. rails were finalised in 1978 in a meeting held at Board's level on 9-6-1978. Bhilai Steel Plant were accordingly advised vide Railway Board's letter No. Track/21/77 dated 9-6-78 to supply 60 kg per meter rails to Indian Railways to UIC section and orders for supply of 4000 mt of rails were placed on Bhilai Steel Plant during 1978-79. The rails thus procured were laid on South Eastern and Eastern Railways.

(3) Based on review of Track Standards in 1972 (BG) the track standdards for Broad Gauge issued in 1973 specified that 30 kg. per meter rail section may be adopted on A, B, C and D group of rails where traffic density is higher than 20 GMT. On sections having lower traffic density, 52 kg. rail section was prescribed. The proposal for introduction of small diameter wheel necessitated the use of rails having ultimate tensile strength of 90 kg/mm^2 (90 UTS rails) on Indian Railways instead of medium manganese rails of ultimate tensile strength of 72 kg/mm^2 (72 UTS) variety and in matter of using 90 UTS rails preference should be given to routes which are identified for operation of BOXN routes. The track standards were revised by Railway Board vide their letter No. 85/W6/TS/3 dated 22-11-1985 which envisaged the use of 60 kg. rails on other routes also where the track is to be laid on concrete sleepers. The Track Standards were further revised to take into account the development of 90 UTS rails by Railway Board vide their letter No. 85/W6/TS/3 dated 26-3-1987.

(4) Dialogue with Bhilai Steel Plant for production of higher UTS rails started in 1982 and the specifications were finalised in 1985. Bhilai Steel Plant has taken up production of 90 UTS rails from 1985-86 onwards on a regular basis.

(5) As on date BOXN wagons are running on 38 Sections having route Kms. 10,225 and track Kms. 13,707.

(6) The max. quantity of rails supplied by Bhilai Steel Plant in any year has been 3.25 tonnes in 1985-86. During 1985-86 and 1986-87 they supplied 6,000 M.T. and 28,000 M.T. of 90 UTS rails respectively and during 87--88 they are expected to supply about 70,000 M.T. of 90 UTS rails and have indicated that by the end of 7th Five Year Plan they will be able to completely switch over to rolling of 90 UTS rails.

(7) Bhilai Steel Plant is not in a position to meet the full requirement of Railways. Therefore, it was decided that they may roll only 52 kg. rails both in medium manganese quality and 90 UTS variety while Indian Railways may import 60 kg. rails to be laid on important routes. The import of 60 kg. rails shall be in 90 UTS variety only.

3·2 Full speed potential of BOXN wagons in loaded condition can be achieved only after the track structure of the concerned routes are further upgraded to heavier than 52 kg. rails i.e. minimum 60 kg. rails which is the next standard section after 52 kg. rails, continuously welded. CASNUB bogies fitted under BOXN wagon is based on design of the American three-piece bogie running on the American Railways for several decades despite its faster wheel wear propensity. In order to achieve higher speed potential and check in the rise of the incidences of rail wear and wheel wear, instructions have been issued that priorities may be accorded to use of 90 UTS rails on high density routes and BOXN routes.

The Project Report on BOXN wagon submitted by RDSO in September, 1974 specifically pointed* out that the work of introducing 60 kg. track on these routes (17 selected routes for BOXN wagons) should, therefore, commence straightaway and should be phased for completion over the Corporate Plan period i.e. by 1988-89. In January, 1981, the Ministry of Railways (Railway Board) decided that all open wagons in the 1981-82 RSP should be ordered as BOXN wagons. Bhilai Steel Plant is the sole supplier of rails to the Railways. Dialogue with Bhilai Steel Plant for production of higher UTS rails started as late as in 1982 and specifications were finalised in 1985.

---

*Para 2·31 and 4·23 of the Project Report.

3.3 The Committee are unhappy over the manner in which the Ministry of Railways (Railway Board) have proceeded in the matter for [illegible]/ replacement of rails with 90 kg./mm sq. UTS. Consequent on the introduction of BOXN wagons in October, 1982, and its acquisition year by year, BG open wagon fleet composes of about 25% BOXN wagons at present (1987) whereas replacement of existing rails by those of requisite standard is painfully slow, even though such replacement was recommended more than ten years back. Only K.K. Line (445 km.) has been relaid with new rails of 90 UTS.

As estimated in the Corporate Plan (1985—2000) freight traffic to be carried by the Railways by 2000 AD is expected to go up from 220 MT in 1980-81 to 600 million tonne in 2000 AD i.e. around three times. To handle such a growing profile of rail-borne traffic, freight trains with much heavier trailing load would be necessary. The Railways propose to run on a selected number of high density and coal routes trains of even 7,500 to 9000 tonne trailing loads. Most of the 17 routes selected for running of BOXN wagons fall in Groups A and B nominated for operation of high speed passenger trains at 160/130 Km/h. Much of the rail traffic-both high passenger traffic as well as high density freight traffic using the same tracks is not considered desirable. The overuse of these dense traffic tracks reduced the general reliability of the Railway operational system. For this, the railway track would have therefore, to be considerably strengthened and modernised. The Railways have also claimed that "there is no increase in rail fractures on rails of higher poundage." Track was already overdue for replacement and there is a limit beyond which the rails cannot be allowed to wear out without jeopardising safety. Most of the Railway systems abroad have already adopted heavier rail sections with higher UTS of 90 Kg/mm sq. which are wear-resistant and have longer service life. As the track modernisation programme involves substantial investment of financial resources and a large volume of production, the Committee consider that renewal of tracks should be straightaway done with rails of 60 kg/m section with UTS of 90 kg/mm sq. This will not only ensure general reliability and improve productivity of the Railway system but will be also vital to safety and long-term economy.

3.4 The indigenous production of rails at present is of 52 kg. rails both in medium manganese quality and 90 UTS variety, whereas the Railways propose to import 60 kg rails to be laid on important routes. The Committee strongly feel that Government should prevail upon the Bhilai Steel Plant to make special efforts for the indigenous production of 60 kg. rail of 90 UTS variety. This step will go a long way in the adoption of latest technology relevant to the needs of the country, reduce dependence on import and save precious foreign exchange.

3.5 The Committee have been informed by the Ministry of Steel and Mines (Department of Steel) in March, 1988 that 60 KG rails are very much

in the production capability of Bhilai Steel Plant. The firm long-term requirements of rails including that of 60 KG 90 UTS rails were projected by the Ministry of Railways (Railway Board) to the Department of Steel/SAIL in February, 1987. The Committee deprecate that the Ministry of Railways (Railway Board) projected their requirements of heavier rails of higher UTS variety only in February 1987 while the standards for track were reviewed long ago. While the Committee would like to be apprised of the further developments in this regard they would also recommend that in future there should be a close coordination and cooperation between the various agencies and decisions/agreements reached well in advance to ensure smooth and timely implementation of Projects.

CHAPTER IV

STABLING OF WAGONS

4.1 The position of stabling of wagons during 1983-87 is as follows:

Year	1983	1984	1985	1986	1987
1. January . . .	225	370	1968	893	3076
2. February . . .	398	727	1776	1331	3008
3. March . . .	545	891	1636	2047	2987
4. April . . .	480	988	1506	2133	2881
5. May	300	1160	1289	2294	2665
6. June . . .	127	1359	1074	2600	2512
7. July	30	1594	845	2723	2283
8. August . . .	—	1542	586	2971	2100
9. September . . .	—	1665	418	2891	1968
10. October . . .	—	1713	404	2994	1756
11. November . . .	—	1784	546	2932	1481
12. December . . .	129	1944	613	2945	1252

4.2 The Committee were informed by the Ministry that the increase in stabling was on account of sudden and substantial increases in the number of wagons to be procured based on mid-term release of funds during various production years. These mid-term increases in target of wagon production did not give sufficient time for arranging free supply inputs leading to stabling of wagons. Another factor which contributed to stabling of wagons during the initial years of production of BOXN wagon was certain delays in receipt of imported supplies of cartridge roller bearings for reasons beyond control of the Railways.

4.3 The Committee were also informed that in case of wagon orders, escalation payment is really a price adjustment to account for the lead time in a long term contract, which is placed much before the actual deliveries are made. Therefore, this escalation is really a component of the price of wagon and is not of the same nature as escalation paid in certain constructions and other contracts arising out of delays in the execution of the contract on the part of the purchaser. Amount of escalation on account of stabling of wagons is nil.

4.4 It was stated by the Railway Board that the problem of stabling of wagons has been engaging the attention of Railway Board and Planning Commission. In consultation with Planning Commission it has now been decided by the Railway Board that orders for wagons should be planned 3 years in advance and procurement of matching free supply components initiated well in time, commensurate with the lead time involved for each individual item.

Necessary procedure in this connection have been finalised by the Government and it has also been decided to initiate procurement of free supply items sufficiently in advance of the actual production year i.e. 12 months in advance for indigenous items and 18 months in advance for imported items. According to the Railway this measure is expected largely obviate stabling of wagons on account of mis-match of inputs.

4.5 The average number of wagons stabled during the period October, 1982 to March, 1985 was 786 per month. This stabling, however, have increased to more than 2000 for March, 1986 every month till August 1987 leading to idle investment of about Rs. 100 crores at present day cost of wagon in one month alone. In the opinion of the Committee this is clearly indicative of faulty planning of wagon production. Moreover the phenomenon of stabling has been continuing right from the day the manufacture of BOXN wagons was commenced. Once the production targets were fixed it was the responsibility of the Railway Board to ensure procurement and supply of matching components to wagon builders for timely wagon production. The Committee deprecate that the Railway Board have taken four years to realise and that too after entailing considerable losses in idle investment to gear up their planning mechanism as a part of their efforts to streamline the wagon production. The Committee hope that this step would yield better results and would like to be apprised of the impact of these measures in eliminating stabling of wagons. The Committee would like to know whether the Railway Board had imposed penalty on any Supplier for delayed supply of inputs which caused stabling.

CHAPTER V

NON-CONSIDERATION OF USERS' DIFFICULTIES

Utilisation of BOXN Wagons

5.1 The marked carrying capacity of BOXN wagon is 58.3 tonnes. With a height of 1950 mm and cubic capacity of 56.3 cum. it was expected that Power House coal, ore, cement etc., would be carried to the marked carrying capacity, while steam coal for Railways and washed coal for Steel Plants could be loaded up to 5 tonnes and 52 tonnes, respectively. In spite of the disadvantage of not being able to carry to the marked carrying capacity and the improvement in train load not being significant or many commodities the Railway Board approved the design in July 1980 asa matter of convenience to the main users (Power Houses and Steel Plants) so that the wagon could be handled without the need or modification of tipplers at the unloading points.

5·2 The Audit Report points out that the use of BOXN wagons for loading coal to power Houses, Steel Plants and Railways themselves has given rise to several disputes and problems regarding:

(i) carrying capacity

(ii) unloading arrangements,

(iii) unloading time and

(iv) system of weighment of BOXN wagons to which satisfactory solutions have not been found so far (August 1985)

5·3 Energy Minister held a meeting on 15-2-86 on weighment of coal supplies to Power Stations. This meeting was attended among others by Minister of State for Railways and officials of Ministry of Railways. The problem relating weighment of wagons was also discussed in the meeting. The issue relating to the weighment of coal was constantly figuring in various meetings subsequently held between Energy Minister and Minister of State for Railways.

5.4 Secretary (Coal) in his letter dated 10-6-1986 addressed to the Chairman, Railway Board listed out the problems faced by Coal Companies after the introduction of a large number of BOXN wagons by Railways and the latter's not paying any attention to the problems of the coal companies while taking decisions regarding the type of wagons, the loading time required, etc.

5·5 In their evidence before the Committee on 29 December, 1986, the representatives of the Departments of Steel, Coal and Power and Electricity

Boards have pointed out that ever since the introduction of BOXN Wagons there have been problems which have not so far been satisfactorily resolved. Many of the difficulties such as carrying capacity of BOXN Wagons substantial modifications in Tipplers and weigh-bridges, loading and unloading time and back loading of finished steel products out of steel plants, etc., still exist.

5·6 According to the Ministry of Railways, the reservations which the user sectors had about the BOXN, had been dealt with as follows :

(i) *Modification of tipplers and its cost*

During the discussions and investigations it transpired that tipplers can be conveniently modified not only to tipple BOXN Wagons but to tipple both ordinary BOX and new BOXN wagons

In fact, Coal Industry Power Houses, Steel Plants, Ports, etc., have modified a number of tipplers. The cost of such modification was nominal.

(ii) *Loadability of BOXN Wagons*

BOXN wagon has been primarily designed to carry coal and other minerals bearing in mind other constraints like *inter alia*, tipplers and wagon length. It is a heavy duty mineral wagon.

It is designed to carry 58·3 tonnes of most types of coal and other heavier minerals. However, in four to five cases, in Korea-Rewa Coal field only it was found that lighter coal could not be carried to the designed capacity.

Loading trials associating coal industry and users were conducted and lower loadability fixed in these cases.

In all other cases coal and minerals can be loaded to the designed capacity

(iii) *Feasibility of modifying present weigh bridges for weighment of BOXN Wagons.*

Investigations had revealed that the existing weigh bridges can be conveniently modified to weigh BOXN wagons. In fact Coal India has initiated the process of modifying weigh bridges wherever required.

(iv) *Demand of Consignees that Pay load of BOXN rakes being higher and more wagons, loading and unloading time should be allowed.* Extra free time has already been allowed

(v) *The Steel Plants, however, expressed some difficulties such as, unsuitability of BOXN wagons for back loading with certian types of finished steel products and some operational problems in the Steel Plants Yard.*

Steel Plants have been assured that :—

(a) with the induction of BOXN wagons, the mix of input of ordinary BOX & BOXN wagons will be adequate to take care of movement of finished steel products;

(b) in case required, empty BOX type wagons will be supplied; and

(c) Railways plan to acquire more BFR type wagons ideally suited for carrying finished products.

(d) SAIL have also been informally advised to identify finished steel products that can be moved in BOXN wagons. The products that cannot be moved in BOXN wagons will be moved largely in BFR/BRH type wagons and/or Box wagons.

5·7 In regard to complaints from Power Houses regarding short receipt of coal, the Ministry of Railways have pointed out that this can be due to various reasons like loss in transit, underloading by the collieries, incorrect accountal at unloading points etc.

5·8 In this connection a survey was conducted for one Railway i.e. Central Railway, for a period of one year (January to December 1986) in respect of short receipt of coal in BOXN wagons, in order to determine the average quantum of such short receipt. This survey indicated that the average short receipt was of the order of 5·1% i.e. 2 to 3 tonnes per BOXN wagon.

It is however not possible to say to what extent spillage contributed to these shortages. Shortage can also be attributed to pilferage enroute and/or underloading by the collieries.

5·9 The Audit Report further points out that Coal India Limited also pointed out (May 1985) that even if loading up to the height and in the manner desired by the Ministry of Railways (Railway Board) was found possible it was not safe to carry coal in that manner as such loading did not take into account the incidence of coal falling off enroute thus constituting a loss not only to the consumer but also to the nation.

5·10 Against this short-coming the Ministry of Railways (Railway Board) have stated that the possibility of spillage of coal as a result of heap loading was duly taken into account in the course of trials conducted in Dec. '85. While describing the heights upto which coal is to be loaded in certain colliery sidings, the loading profile was also recommended which was mostly trapezoidal. The Ministry of Railways (Railway Board) claim to have observed during trials that the coal in the wagons settles down after moving a very short distance and has accordingly claimed that with trapezoidal loading and side pockets of nearly 10 to 15 cms deep on all sides of the wagons, there is no possibility of spillage during transit.

5·11 According to the Ministry of Railways (Railway Board) the Committee to study permissible free time for unloading BOXN wagons have since submitted their Report. Based on the Committee's recommendations, suitable instructions have been issued to the Ministry of Railways (Railway Board) revising the free time for unloading of BOXN wagons. The enhanced free time has been made applicable w.e.f. 01-01-1988 and will remain in force for a period of three years. The siding holders, in the meantime, have been asked to improve their infrastructure for unloading of wagons.

5·12 The Committee note that in 1982, the Ministry of Railways (Railway Board) introduced modified BOX wagons called BOXN wagons. Immediately after the introduction of BOXN wagons in sizeable number, a number of representations were received from the bulk consumers such as Power Houses complaining about substantial shortages in the coal quantities received by them than the marked carrying capacity. They also expressed their difficulties over the introduction of BOXN wagons which led to problems like weighment, loadability of BOXN wagons, loading and unloading time, unsuitability for finished steel products, modification of tipplers and lack of infrastructural facilities for handling full rakes.

The Committee is perturbed to note that the Secretary of the Department of Coal wrote to the Chairman, Railway Board in June, 1986 four years after the introduction of BOXN wagons, listing out the problems faced by the coal companies and according to him the Railways did not pay any attention to these problems. In their evidence before the Committee in December 1986, the representatives of the Departments of Coal, Steel, Power and Electricity Boards stated that some of the problems still existed. The Committee are now informed that remedial measures have been taken and all difficulties that user sector had apprehended are being resolved. The Committee deprecate the lack of seriousness and promptitude which the Ministry of Railways (Railway Board) have demonstrated in dealing with the problems of bulk users in time.

The Committee is of the opinion that the Railways had adopted a casual approach to these problems and have taken unduly long time in settling the disputes. Necessary investigations into the aforesaid complaints should have been carried out immediately when BOXN wagons were pressed into commercial operation and at this stage, the Committee can only express the hope that the Railway Board would have taken suitable lesson from this sad experience and would be responsive and considerate to users and would not allow this lackadaisical approach in dealing with such vital issues in future.

5·13 According to the Ministry of Railways (Railway Board), meetings were held between RDSO, Tippler Manufacturers, Steel Plants and Port Trusts in October and December, 1982 for sorting out problems connected with the introduction of BOXN's. The BOXN wagon was mainly intended to be used for transport of coal and iron ore, etc. These wagons were brought into-

service from October 1982 and they were in sizeable number in WCL collieries by the end of 1983. Meanwhile bulk orders on wagon builders for manufacture of 16,400 BOXN wagons were placed in July 1982.

6260, 10, 380 and 13,263 BOXNs were in use by the end of March 1985, March 1986 and March 1987, respectively. Once a policy decision had been taken to go in for BOXN as early as 1982, and the concerned Departments had been apprised of the same, the Committee deprecate as to why move was not initiated by the Departments concerned to synchronise the required alterations and improvements. At present, about 16500 BOXN wagons are in service. Simultaneous action which ought to have been initiated in time so that provision of infrastructural facilities such as modification of tipplers by Power Houses and Steel Plants, modification of weigh-bridges to enable weighment of BOXNs at certain colliery sidings and development of sidings fit to handle BOXN rakes both at collieries as well as at unloading terminals could have been provided in time. Importance of necessary infrastructural and operational facilities cannot be over emphasised. Economics and optimum utilisation of the transport capacity created in new BOXN wagon hinged on development of these infrastructural facilities. The Committee desire that the Departments concerned should promptly provide these facilities wherever these are still lacking, within a time bound programme for intensive utilisation of assets created in BOXN wagons and optimisation of Railways productivity. The Committee would like to be apprised of developments in this regard. They would also like the implementation of these measures to be closely monitored and controlled with appropriate inter-action between the various agencies involved.

5·14 The Committee also note that the designed loadability of 58 tonnes of coal in BOXN wagon was possible only with heap loading. The Coal India Ltd. has pointed out that such loading did not take into consideration the incidence of coal falling enroute. According to Railway's own survey, the short receipt of coal by the consumer was to the extent of 5·1 per cent, though the extent of shortage attributable to spillage and pilferage could not be excluded. In any case the shortage is a significant loss to the nation. The Committee would like this aspect to be investigated with a view to taking appropriate remedial measures with due promptitude. They would also like to be apprised of further development in this regard.

Further, there is at present no weighment facility for BOXN wagons, the modifications to existing weighbridges or installation of new weighbridges are stated to have been taken up. The Committee are surprised how the Railway Board could embark upon such a venture, viz. introduction of a new type of wagon, without considering its effect on the consumers and the measures which they would be required to take including the loading time required therefor.

CHAPTER VI

ADVANTAGES OF BOXN WAGON

6·1 The Ministry of Railways (Railway Board) have given details of advantages which have accrued to the Railways as a result of introduction of BOXN Wagon over BOXC (See Appendix II).

6·2 In a note submitted to the Chairman, PAC during his visit to RDSO further advantages were detailed as follows :

"(1) The BOXN wagon was introduced on the Indian Railways in 1982-83. The table given below gives the size of the fleet of BG bogie open wagons (BOX & BOXN) vis-a-vis the NTKMs pertaining to revenue coal in the years 1978-79, 1982-83 and 1986-87. The years have been so chosen to indicate the position 4 years prior to and 4 years subsequent to the introduction of BOXN Wagons.

Year	Total holding in vehicle units			NTKM for revenue coal (in mill.)	% increase in 4 years	
	BOX	BOXN	Total		Wagon Fleet	NTKMs
1978-79 . .	42983	—	42983	36318	—	—
1982-83 . .	49915	201	50116	47893	16·6	31·9
1986-87 . .	47065	13263 (22%)	60328	71709	20·4	49·7

(2) It would be seen from the above table that during the 4 years period prior to the introduction of BOXN wagons, BG bogie open wagon fleet (consisting of BOX wagons) increased by 16.6% corresponding to an increase in the NTKM for revenue traffic by 32%. During the 4 years' period after introduction of BOXN wagons, i.e. by 1986-87 the BG bogie open wagon fleet (composed of 22% BOXN wagons and 78% BOX wagons) increased by 20.4% whereas the revenue NTKMs increased by about 50%.

(3) Thus, with the introduction of BOXN wagons, it was possible to carry higher level of coal traffic with comparatively lesser addition to stock.

(4) Introduction of BOXN wagons also helped in increasing throughput even in saturated routes. For instance, as per a sample survey, 103 trips were made by BOXN rakes during the 15 days from 1-3-86 to 15-3-86 in the East-North circuit. Since a BOXN rake

carries approximately 30% more payload, the number of trips by rakes composed of BOX wagons for moving the same level of traffic would have been 134. i.e. about 2.1 additional trains per day. In view of the condition of saturation obtaining on the route, it would not have been possible to run these extra trains as a regular measure. And, with the ever increasing demand for rail transport, Railways are, to lesser or greater degree, encountering similar situation on other routes"

Impact of manufacture of BOXN wagons on availability of other wagons

6·3 Out of the production of different types of four-wheeler BG wagons during the Sixth Plan period (1980-81) to (1984-85), 30 per cent were of BOXN type. According to Audit switch over to production of BOXN wagons which move in closed circuit and have limited use appears to have affected the wagon availability on the Railways as could be gauged from the outstanding wagon registrations on broad-gauge which were as shown below:

31st March 1982	58038
31st March 1983	35056
31st March 1984	38959
31st March 1985	71570

6.4 The Ministry of Railways (Railway Board) have opined that the importance of movement of coal by rail in the required quantities cannot be over-emphasised—firstly, it is the primary source of energy; secondly, it is essentially required for heavy industry like Steel, Cement, Fertiliser and lastly, it is required for various sensitive sectors like textile industry, brick kilns, etc. It constitutes about 40 per cent of the freight traffic carried by Indian Railways. It is, therefore, essential for Indian Railways to provide adequately for movement of coal.

Within the resources made available to Indian Railways, there is no alternative but to accord higher priority for acquisition of rolling stock required for the movement of coal. To the extent resources are not available, shortage of rail transport has to be mostly borne by the traffic in general goods for besides coal, essential commodities, like foodgrains, fertilisers petroleum products, raw materials for various industries, etc., have necessarily to be moved on priority to avoid bottlenecks in national economy.

Despite this, the Ministry of Railways (Railway Board) have submitted that the movement of general goods has not been allowed to suffer. The loading of general goods in recent years has been reported to be as under:

(In million tonnes)

1983-84	36·32
1984-85	34·94
1985-86	38·21
April-August	
1985-86	14·86
1986-87	15·78

As a result of better supply of wagons for general goods traffic, the indents awaiting compliance at any given time have registerd a sharp decline. At present it is in the range of 20,000 which is roughly two day's loading.

6·5 According to the Ministry of Railways (Railway Board), during the 4 years period after introduction of BOXN wagons the BG bogie open wagon fleet (composed of 22% BOXN wagons and 78% BOX wagons) increased by 20·4% where as revenue NTKMs increased by 50 per cent.

6.6 According to Indian Railways Year Books 1980-81 onward during 1976-77 the tonnage lifted was 212·6 MT, an all time high. The subsequent years, however, witnessed a declining trend upto 1979-80 when it plummetted to just 193 M.T. As a result of the adoption of certain managerial decisions and operating innovations, it became possible to reverse the declining trend and from the year 1980-81 onwards the freight traffic witnessed steady growth.

6·7 The more important managerial decision and operating innovations included—segregation of wagons fitted with roller—bearings and centre buffer couplers from the conventional type of wagons, organising of separate rakes for movement of bulk commodities like foodgrains, fertilisers, cement and coal, identification of over aged and unfit wagons and their condemnation, introduction of end-to-end running of through goods trains from the originating station to the terminating station by-passing intermediate marshalling yards, movement of close circuit rakes to meet the demands of major customers, disciplined management, intensive monitoring of freight movement, use of BOXN type wagons, conceptual shift from wagon loads to train loads to optimise use of rolling stocks and freight operations, utilisation of high capacity wagons, more modern locomotives and installation of improved signalling devices. All these measures have cumulatively contributed to the higher level of efficiency and better mobility.

6·8 The Committee is of the opinion that achievement of the Railways in the movement of freight traffic as claimed by the Railways, is not mainly due to introduction of BOXN wagons only.

AMAL DATTA
Chairman,
Public Accounts Committee.

NEW DELHI;
7April, 1988
18 *Chaitra,* 1910 (*Saka*)

APPENDIX 1

(*See* para 1·1 of the Report)

[*Paragraph* 8 *of the Report of the C & AG of India for the year* 1984-85, *Union Government (Railways) on BOXN Wagons*]

BOXN WAGONS

8. Boxn Wagons

Introduction

8·1 To meet the growth of bulk traffic in coal, ore, cement, foodgrains, etc., by increasing the throughput (i.e., increased unit loads per train and higher average speed of goods trains) the Railway Board directed the Research, Designs and Standards Organisation (RDSO), in September 1972, to design a new wagon with 20·3 tonne axle load which would have features similar to existing BOX wagons but should be of shorter length and, utilising the advantage of height should be able to give maximum possible pay-laod for coal handling and increase the throughput with the existing track structure and loop lengths. Accordingly, in September, 1974 the RDSO evolved a new design of bogie open wagon designated as BOXN wagon.

The design of the wagon was expected to increase the throughput within the existing standard loop length of broad gauge track, loading density and other infrastructure without the necessity of additional investment on these. The wagons were expected to permit hauling of heavier freight trains of 4500 tonnes and later of 7500 tonnes from the existing freight level of 2500 to 3210 tonnes at higher speeds.

8·2 BOXN wagons were brought in service from October 1982 and 6260 wagons were in service by the end of March 1985. The introduction of BOXN wagons had become a controversial issue with regard to its acceptability by major users such as Power Houses and Steel Plants and there were serious misgivings whether BOXN would be the 'future wagon' and the benefits expected to accrue could be achieved in service.

Development of the design of BOXN wagon

8·3 The RDSO proposed three designs in March 1973. These were considered by a Committee of Directors and a Project Report was submitted by the RDSO in September 1974. The Project Report was considered by the Railway Board and approval for detailed design work for a wagon with 2460 mm inside body height was given in March 1975. The RDSO completed the detailed design in November 1977. In January 1978, the Railway

Board approved the manufacture of 10 prototype wagons and decided that after the behaviour of the wagons was studied series production to complete one rake of 4500 tonne train would be taken up with the approval of the Railway Board. The Railway Board further decided that a techno-economic study of various aspects involved in running 4500 tonne trains should be put up to the Railway Board before undertaking series production.

8·4 An order for manufacture of 10 prototype wagons was placed on Golden Rock Workshops, Southern Railway in February 1978, which was completed in November 1979.

8·5 Meanwhile, in March 1979, even before the completion of manufacture of prototypes and contrary to their earlier decision about the study of behaviour of the wagons before manufacture of one rake and without undertaking a techno-economic study, the Railway Board enhanced the order to 105 BOXN wagons for constituting two rakes for service trials with a gross train load of 4500 tonnes. The two rakes were to be of different bogie designs for comparative evaluation of performance. Again in March 1980, even before the manufacture of two rakes (105 wagons) had commenced the Railway Board placed orders on Golden Rock workshops for manufacture of 430 more BOXN wagons making a total of 535 wagons on order.

8·6 The prototype wagons were fitted with Casnub bogies, cylindrical bearings and single-pipe air brake and had an inside height of 2460 mm in accordance with the design approved by the Railway Board in January 1978. The trials on these wagons were completed in September 1980 only. Meanwhile, the RDSO and the Railway Board had reviewed and revised the design parameters. It was decided (July 1980) to provide for an inside height of 1950 mm only. Further in January 1981, even before the manufacture of 105 BOXN wagons (for trains in two rakes) had commenced, the Railway, Board decided that all open wagons in the 1981-82 Rolling Stock Programme should be ordered as BOXN wagons. The Railway Board also laid down that conceptually all BOXN wagons should be capable of operation in 7500 tonne trains formation at 90 kmph even though initially some of the wagons might be utilised on 4500 tonne trains. The Railway Board also ordered that for expediting production of BOXN wagons during 1981-82 immediate action should be initiated for indigenous development of free supply items (bogies, couplers, air brakes, etc.) to wagon builders and till such development was achieved crash import of items required should be arranged. The additional order for 430 wagons placed on Golden Rock Workshops was also transferred to trade for ensuring earlier deliveries. Bulk orders on wagon builders for 16,400 BOXN wagons (approximate cost Rs. 656 crores) were placed in July 1982. This important decision and change in concept from 4500 tonne trains to 7500 tonne trains necessitated change in specification of sub-systems such as couplers, bogies, and brakes, etc.

8·7 Whenever a new rolling stock is decided upon the prototype has to be subjected to a large number of tests and trials before it is cleared for general operation. In the case of BOXN wagon it was decided to subject it to the following tests and trials :

(i) Oscillation trials
(ii) Impact tests
(iii) Rolling resistance trials
(iv) Braking distance tests.

These tests were considered essential to clear the wagon for heavy freight operation.

8·8 The prototype wagon was subjected to oscillation tests in 1980 and after evaluation of the results the wagon was cleared in November 1981 for a speed of 75 kmph on track laid with 90 lb rails. This was far below the design parameter of 90 kmph laid down by the Railway Board in January 1981. Even after further trials in April 1982 on better maintained track the wagon was cleared for 90 kmph in empty condition only and it was found that in loaded condition it was not possible to permit a speed of ovr 75 kmph.

8·9 In terms of speed potential the wagon was no better than the existing design of BOX wagon.

8·10 The Department of Railways (Railway Board) stated (February 1986) that, while the speed potential of 90 kmph in the loaded direction had not been achieved, nevertheless it had not been an impediment in the attainment of the objective of a higher throughput.

8·11 The other trials, *viz.*, braking distance tests and rolling resistance trials were completed in October/November 1983.

8·12 Thus the earlier decisions taken by the Railway Board in January 1978, *viz.*, that a study of the behaviour of prototype wagons and techno-economic study should be undertaken before commencement of series production was not given effect to and bulk orders for BOXN wagons were placed by the Railway Board committing the government to an investment of Rs. 656 crores before the new design had been evaluated for technical and commercial acceptance.

8·13 The principal points of difference between BOXN wagon and BOX wagon are given in Annexure VI. Initially, the RDSO had proposed a design with inside body height of 2460 mm and cubic capacity 68·58 cum as against the corresponding dimensions of 1880 mm and 68·59 cum of BOX wagon. The approximate gross load per train of 55 BOXNs was 4470 tonnes against 3495 tonnes of 43 BOX wagon train *ie*, an increase of 28 per cent in the trailing load, the length of the train remaining within 600 metres.

Subsequently, the height of BOXN wagon was reduced to 1950 mm as a matter of convenience to the users, reducing the volumetric capacity to 56·28 cum. It was expected that the reduction in height would increase the pay load from 57 tonnes to 58·3 tonnes. The implications of a design with a volumetric capacity of 56·28 cum are discussed in the later section dealing with the utilisation of BOXN wagon.

8·14 The design finally adopted requires use of (a) 22·9 tonne axles load casnub cast steel bogie (though the axle load is limited to 20·3 tonnes), (b) 22·9 tonne capacity axles and wheelsets, (c) cartridge tapered roller bearings, (d) twin pipe air brakes, and (e) high tensile couplers and draft gears. Though from first cost considerations the choice of casnub bogie, 22·9 tonne wheelsets, etc., were expensive, their choice was determined on the consideration that the design features besides enabling haulage of heavier trains would ensure a 'Zero defect' wagon in the sense that the wagon would require very little maintenance effort. The improved technical features were: Casnub bogies to ensure zero failures on the run as against the fabricated bogies of earlier BOX wagons which were developing a large number of welding failures; cartridge tapered roller bearings to minimise the large number of failures being experienced with cylindrical roller bearings on BOX wagons; Air brakes to eliminate the large number of troubles experienced with vacuum brakes like brake fade, inoperative brake cylinders, etc, and reduce maintenance work; and fitment of enhanced capacity high tensile couplers to enable running of 7500 tonne trains as at a later date as the couplers provided on BOX wagons are not suitable for more than 6500 tonne trailing loads, while the enhanced capacity couplers being fitted on BOXN wagons would enable trailing loads of even 10,000 tonnes.

Performance of BOXN Wagons

8·15 The in-serivce experience of BOXN wagons had shown that the expectations in regard to technical superiority of the design had been belied and the economic viability was doubtful as explained in the succeeding paragraphs

8·16 The performance of BOXN wagons during the three years upto July 1985 showed that incidence of sick marking was on an average 4·6 wagons per trip as against 1 to 1·5 wagon per trip as contemplated. The design also revealed several adverse features. These were :

Bogie defects :

(a) abnormal wheel flange wear requiring more frequent turning—

While the conventional BOX wagons require tyre turning during periodical overhaul, once in four years, in the case of BOXN wagons the wheels are required to be turned in approximately 7/8 months and sometimes even once in four months;

(b) high wear on wedges and side frame column liners;

(c) breakages of snubber and load bearing springs;

(d) excessive deflection of brake beam;

(e) fracture of centre pivot and spring planks etc;

Air brake defects :

(a) distributor valve defective;

(b) break beams bent/broken;

Wheel defects :

(a) flat wheels, wheel skidding, etc;

Other defects: coupler defects

8.17 The seriousness of the problem could be gauged from the data for the period December 1934 to April 1985 showing detachment of wagons from the rakes on account of the above defects.

Detachment on account of	December 1984	January 1985	February 1985	March 1985	April 1985
I. At Primary Maintenance and Terminal Depots :					
1. Routine Overhaul (ROH)	97	119	147	160	142
2. Wheel defects . .	321	596	599	899	867
3. Air brake and brake gear defects . . .	384	350	487	400	521
4. Bogie defects . .	14	23	13	31	24
5. Other defects . .	40	44	49	151	149
6. TOTAL . . .	*856	1132	1295	1641	1703
II. *Enr oute*	*3	38	37	17	37
GRAND TOTAL . .	*859	1170	1332	1658	1740

*Excluding the figures of Eastern Railways.

8.18 Obviously the objectives of incorporating special features in the design, viz., casnub bogies and air brakes, with a view to achieving a zero defect wagon have not fructified. The combination of casnub bogies and air brake was expected to give trouble-free service during a complete round trip after intensive repairs at a nominated base maintenance depot, with availability of brake power beyond the safe level of 85 per cent originating effective brake power and minimising the repair work load at terminals. On the contrary in the case of BOXN wagons the maintenance efforts have had to be increased. For example, at New Katni Junction, a nominated based depot on Central Railway which catres to the maintenance of 3500

wagons, the average wheel reprofiling (to rectify the wheel flange wear) was of the order of 36 per day. At this depot, there were 945 detachments in May 1985 which increased to 1057 in June 1985, of which 358 and 679 respectively were on account of wheel defects. Because of inadequate reprofiling facility the depot was compelled to turn out wagons with ground sharp flanges which did not have a useful life of even two months. In this depot during the six months upto June 1985 there were 541 breakages of springs. Similarly, at Mughalsarai maintenance depot which caters to about 3800 *BOXN wagons the number of wagons marked sick was: July 1985—136 wagons from 126 rakes, August 1985—369 wagons from 153 rakes and September 1985—400 wagons from 150 rakes; percentage of sick wagons having increased from 2 to 5. Also a test check of 400 wagons showed that out of these, 232 wagons had been marked sick during the period from January 1985 to October 1985 and that the same wagon was marked sick mainly on account of wheel defects/brake defects approximately 2.7 times (average) indicating the high frequency of occurrence of defects. On the Northern Railway, four wagons were detained for 57 to 110 days during April to July 1985 for want of BOXN wheels.

8·19 The defects in air brakes were attributable to defective supply of a vital component by a firm. The Railways were not able to achieve the desired brake power on BOXN trains. Only 70 per cent of the trains having the primary maintenance depot on Eastern Railway had 100 per cent brake power. The position was similar on Western Railway.

8·20 Moreover, it was observed in Mughalsarai maintenance depot that on account of application of air brakes the brake blocks were wearing out fast and needed frequent replacement. The number of brake blocks changed in the reception yard during train examination was :

August 1985	2315	(In 155 rakes)
September 1985	1655	(In 145 rakes)
October 1985	3895	(In 178 rakes)
Novermber 1985 (Upto 20th)	2110	(In 114 rakes)

8·21 In December 1984 the Railway Board had fixed the shed maintenance schedule (routine overhaul) for BOXN wagon as once in a year. However, in view of high frequency of incidence of defects, the Railway Board decided (October 1985) that the maintenance should be undertaken at intervals of 9 months; for BOX wagons the shed maintenance schedule is 18 months.

The Department of Railways (Railway Board) stated (February 1986) that the standard practice on Railways is to work out sick percentage in relation to the total holdings. On this basis average sick

*Holding in October, 1985.

incidence of BOXN wagons per day was less than one per cent. They further added that the wear on brake blocks in BOXN wagons at Mughalsarai Depot was, among other factors, related to the intensity of usage. They also stated that the frequency of the routine overhaul on BOXN wagons had been changed from 12 months to 9 months to effect scheduled preventive maintenance and thus further minimise and control unscheduled occurrence of defects. But the instructions issued by the Railway Board in October 1985 envisaged that planned preventive maintenance at an interval of nine months should be undertaken with a view to repair/change all worn out, damaged/defective components so that wagon so attended did not call for repairs due to routine wear and tear.

8·22 For repair and maintenance of BOXN wagons the Railway Board nominated a particular depot on each Railway with facilities for (i) plant and equipment for air brakes, (ii) wheel reconditioning equipment, (iii) machinery and plant for wagon repairs, (iv) other equipment and (v) mechanical handling equipment. The cost of setting up these facilities was estimated at Rs. 108·5 lakhs. As these facilities are in addition to the facilities available for BOX wagons the extra investment is attributable to the introduction of BOXN wagons.

8·23 The 105 BOXN wagons manufactured in Golden Rock Workshops were commissioned in Waltair in two lots—one in February 1982 and the other in September 1982. The first rake was utilised on the Kottavalasa—Kirandul line (KK line) from August 1982. The incidence of bogie defects such as high flange wear came to notice even in October 1982. When the rake had earned about 25000 kms and when it was being trasferred to coal circuit it was reported that a large number of wagons had sharp flanges. The RDSO who investigated the defects concluded that wheel wear was primarily attributable to the running on KK line and further trials would be needed to establish the wear pattern under the new casnub bogie and comparative wear pattern under other types of bogies.

8·24 In 1982 the Railway Board approved of the trials being conducted to evaluate the comparative performance of casnub bogies. After 18 months, in July 1984, the RDSO concluded that the wheel wear rate in the case of BOXN wagon with casnub bogie would be twice as high than in the case of BOX wagons. The RDSO recommended that it would be necessary for the Railways to equip the sick lines (*e.g.*, the wagons repair depots) with adequate capacity for wheel turning and also to plan for adequate spare wheel sets on replacement account.

8·25 Keeping in view the various problems encountered with the casnub bogies, the Railway Board decided that they should import 6000 modern bogies of different types which should be tried on different sections and evaluated before making a final choice. In the justification for import it was mentioned by the Railway Board that the casnub bogie had thrown up serious problems in the form of excessive wheel and rail wear and that the problem did not lend itself to any simple solution by way of modification/retrofitting of the casnub bogie as wheel wear was basically a function of wheel rail interaction peculiar to a particular vehicular suspension design. (The actual import of bogies was stated to be limited to 1800 bogies.)

8·26 Evidently, it was not prudent on the part of the Railway Board to have ordered bulk production of BOXN wagon without knowing the results of the trials originally envisaged in January 1978 and gaining service experience. If as admitted by the Railway Board the defects have no simple solution as the bogies have inherent defects and the Railways have to resort to import of bogies before developing a suitable bogie, the operation of BOXN wagons already manufactured and on order would involve heavy maintenance expenditure. Further the incorporation of 22·9 tonne axles and wheelsets with a view to operating the wagon to 22·9 axle load and high tensile couplers with a view to running 7500 tonne/10,000 tonne trains at a future date does not give any advantage but was expensive. The cost of a BOXN wagon is Rs. 5 lakhs and that of a BOX wagon Rs. 4·5 lakhs (approx.).

Procurement of BOXN wagons

8·27 As decided by the Railway Board in January 1981, action was initiated for procurement of inputs, such as wheelsets, bogies, air brakes, etc., even in May/June 1981. In September, 1981 the Railway Board decided that 50 per cent of the wagons to be procured during the Sixth Plan period (1980-81 to 1984-85) should be BOXN wagons, i.e., about 20,000 BOXN wagons. It was also decided that by March 1983, 3000 BOXN wagons should be manufactured. As the design of the new wagon incorporated special features most of the inputs required import fully or partly. The position of input planning in July 1981 and actual ordering was as under :

Details	Tender opening	Date of order
Bogies	30-5-81	May, 1982
Air brakes	29-6-81	March, 1982
Wheelsets	22-5-81	September, 1981
Cartridge bearing	22-7-81	June, 1982
High tensile couplers (*)	9-6-81	January, 1982

*As the development of high tensile draft gear was delayed the wagons were fitted with enhanced capacity couplers with normal draft gears.

8·28. The orders on wagon builders were placed in July 1982 for 16,400 BOXN wagons. The actual production of BOXN wagons is shown below :

Year	Actual production (wagons in units)
1981-82	56
1982-83	827
1983-84	3908
1984-85	3470
TOTAL	8261

Though the Railway Board had initiated action even in May/June 1981 for procurement of inputs and the supplies of wheelsets had started coming in 1981-82 itself, the wagon production did not pick up till 1983-84. Consequently, there was idling of 22.9 tonne wheelsets costing Rs. 6 crores as commented upon in paragraph 10 of the Advance Report of the Comptroller and Auditor General of India for the year 1982-83—Union Government (Railways).

8·29 Even during the years 1982-83 and later the procurement of other inputs (mainly bearings, air brakes, etc.) did not match the production of wagons and consequently a large number of wagons remained stabled. The month-wise stabling of BOXN wagons with wagon builders is shown below :

(Number of wagons stabled)

Month	Year			
	1982	1983	1984	1985
January	—	225	370	1968
February	—	398	727	1776
March	—	545	891	1636
April	—	480	988	
May	—	300	1160	
June	—	127	1359	
July	—	30	1594	
August	—	—	1542	
September	—	—	1665	
October	38	—	1713	
November	100	—	1784	
December	207	129	1944	

Though the production up to March 1985 was 8261 wagons, on account of stabling of 1636 wagons with wagon builders only 6615 wagons were available, of which 6260 had been commissioned for traffic.

8·30 The average number of wagons stabled during the period October 1982 to March 1985 was 786 per month. The large scale stabling of wagons indicated lack of the proper planning of inputs. As 90 per cent payment of the cost of wagon (Rs. 4 lakhs approximately) had to be made on completed wagons including stabled ones, an amount of Rs. 28·3 crores may be considered as idle investment from October 1982 to March 1985, In addition the wagon builders were paid escalation claims on stabled wagons also. In respect of one contract for 4706 BOXN wagons the firm had produced 2763 wagons up to March 1985 and on an average 269 wagons per month had been stabled during the period October 1982 to March 1985. The total escalation claims paid to the firm amounted to Rs. 423·97 lakhs which included Rs. 36·43 lakhs towards stabled wagons.

8·31 According to the Railway Board the stabling of wagons was mainly on account of (i) delayed receipt of wheelsets, (ii) disruption in supply of imported components, (iii) delay in development of indigenous components by suppliers of cartridge bearings, (iv) change in production programme during mid-year, and (v) delay in inland transportation of components (steel). However, with the experience gained in the manufacture of BOXN wagons things had started improving and stabling had come down to 404 BOXN wagons on 31st October 1985.

8·32 It has, however, to be the mentioned that considering the magnitude of the financial loss on account of idle investment due to stabling of wagons the planning on the part of the Railway Board was not realistic.

Utilisation of BOXN wagons

8.33 The commercial features of the design of BOXN wagons are :

(a) Shorter length which will enable trains of heavier load to be run.

(b) Higher body height and width.

(c) Three doors on each side for unloading (as against 5 doors on each side on BOX wagon).

(d) Increased carrying capacity of about 2 tonnes.

(e) Increased gross load and pay load of trains of 4500 tonnes and 3235 tonnes as against 3500 tonnes and 2400 tonnes respectively of BOX wagon trains.

8.34 THE BOXN wagon was expected to retain the characteristics of a general purpose wagon in the sense that it could be used for loading all bulk commodities such as coal, ore steel, cement, foodgrains etc., and no major change in loading and unloading facilities would be required.

8.35 The load a bility of the wagon envisaged for various commodities as per the design finally adopted (1950 mm body inside height) compared with BOX wagons was as under:

Commodity	Net Pay load per train of		Increase %
	43 BOX wagons	55 BOXN wagons	
	(Tonnes)		
Coal for Power Houses	2450	3150	28
Coal for steel Plants	2450	2860	16.5
Coal for Railways	2450	2750	12
Wheat	2408	2571	7
Urea	2408	2423	—

It was expected that for other commodities like iron ore, manganese ore, limestone, cement, etc. full capacity of 3150 tonnes per train would be utilised.

8.36 It will be observed that the relative gain in train load is less for foodgrains, fertilisers and certain types of coal. Even in the case of coal a 4500 tonne train of 55 BOXN wagons could carry only 12–16 per cent more than a 43 BOX wagon train, though it involved an extra investment of Rs. 65 lakhs on wagons alone per rake.

8.37 The marked carrying capacity of BOXN wagon is 5833 tonnes. With a height of 1950 mm and cubic capacity of 56.3 cum. it was expected that Power House coal, ore, cement etc., would be carried to the marked carrying capacity, while steam coal for Railways and washed coal for Steel Plants could be loaded up to 50 tonnes and 52 tonnes respectively. In spite of the disadvantage of not being able to carry the marked carrying capacity and the improvement in train load not being significant for many commodities, the Railway Board approved the design in July 1980 as a matter of covenience to the main users (Power houses and Steel Plants) so that the wagon could be handled without the need for modification of tipplers at the unloading points.

8.38 The use of BOXN wagons for loading coal to Power Houses, Steel Plants and Railways themselves has given rise to several disputes and problems regarding :

(i) carrying capacity,

(ii) unloading arrangements,

(iii) unloading time, and

(iv) system of weighment of BOXN wagons to which satisfactory solutions have not been found so far (August 1985).

8.39 It was not possible to weigh BOXN wagons on the existing weigh bridges of the Railways' at the collieries, Steel Plants or other users' premises because of its shorter length. Consequently, these wagons are not weighed and freight is collected on the notified chargeable weight. The Railway Board had decided that all future weighbridges should be electronic ones capable of handling all kinds of wagons. No progress, however, has been made in the choice, standardisation and installation of electronic weighbridges.

8.40 The Project Report identified 17 routes for running BOXN wagons. These were revised from time to time and in October 1982 the Railway Board decided that BOXNs should be run on priority basis on (i) Korea-Rewa section for coal, (ii) Hospet-Madras for iron ore, (iii) Waltair-Kirandul for ore, (iv) Bokaro-Kiriburu Rourkela-Bhilai for ore and washed coal, and (v) Singareni-South India for coal. At the end of March 1985, 6,260 BOXN wagons were running.

8.41 Soon after the introduction of BOXN wagons in the coal circuit of Korea-Rewa section, reports were received from consumers—Gujarat Electricity Board, Maharashtra State Electricity Board and others that the coal received by them in BOXN wagons was less than the marked carrying capacity. The Gujarat Electricity Board also pointed out that it was losing huge amounts on account of short receipt of coal and railway freight thereon and that there were no facilities for weighment of BOXN wagons with the collieries or with the Railways.

8.42 The RDSO who conducted loadability trials stated (December 1982) that the BOXN wagon had been designed with a volumetric capacity of 56.3 cum. and the wagon was optimal for transport of coal of density 1045 kg. per cum. with heap loading, *i.e.*, loading above the brim in heaps instead of loading level up to the brim. The Railway Board directed the RDSO to carry out further investigations as the densities of 13 out of 14 types of coal produced was less than 1045 kg. per cum. The Traffic Research Directorate of the RDSO completed the loadability trials in the collieries linked to the Power Houses in the Western region, in November 1983. A total of 66 samples in 41 collieries were tested and the results showed that loadability was on an average 52.6 tonnes for slack coal, 51.1 tonnes for steam coal and 54.0 tonnes for Run of Mine (ROM) coal. The RDSO also observed that in Korea-Rewa coal-fields grades A, B, C, & D (non coking) and coking coal constituted nearly 85 per cent of total coal produced and all these grades of coal had a higher bulk (being of lighter variety). The remaining 15 per cent was of low bulk density for which the full carrying capacity of BOXN wagon could be achieved.

8.43 Based on the trials (mentioned above) the Railway Board decided in November 1983 that the chargeable weight for slack coal would be 55 ton-

nes and steam coal 54 tonnes (against marked carrying capacity of 58.3 tonnes) as an interim measure. The Railway Board also directed that more tests should be conducted under normal loading conditions.

8.44 The decision to reduce the chargeable weight resulted in a reduction of the earning capacity of the BOXN wagon *vis-a-vis* the BOX wagon.

8.45 The free time for loading/unloading of a full rake of BOXN wagons was also fixed as 10 hours and 11 hours for manual loading and unloading respectively and 9 hours and 10 hours for mechanical loading and unloading respectively with effect from 1st December, 1983 though according to Railway Board machanical unloading could be possible within 6 to 7 hours.

8.46 Meanwhile, the Gujarat Electricity Board had started deducting straightaway an ad-hoc 20 per cent from the bills of the collieries in respect coal received in BOXN rakes. A firm of Ahmedabad had filed a suit against the Railways and Coal India Limited for the losses sustained (about Rs. 9,900 per wagon) in respect of coal received in BOXN wagons. For steam coal (loco coal) meant for railways' own consumption the Central and Western Railways reported that coal received in BOXN wagons was weighing between 44 and 50 tonnes against the marked carrying capacity of 58.3 tonnes. The Railway Board directed the railway in November 1983 that payment to collieries for coal in BOXN wagons should be made to the extent of 80 per cent only of invoiced quantity. These instructions were subsequently revised (April 1984) and the Railways were authorised to make payment of 90 per cent of invoiced quantity for coal received from 1st December 1983 to 24th April 1984 and 100 per cent payment from 25th April 1984 based on 54 tonnes if coal was supplied from Churcha, Korea I and Korea II coalfields subject to certification by loading Railway (South Eastern Railway) that the correct methodology for heap loading to 54 tonnes was followed. Based on these instructions the Central Railway Administration alone had withheld an amount of Rs. 97.8 lakhs from the coal bills for the period August 1983 to September 1984. On the Western Railway the payment was not regulated properly. Payment to the extent of 90 per cent was made in respect of coal received prior to 1st December 1983 contrary to Railway Board's instructions resulting in over-payment of Rs. 24.58 lakhs. Even after the issue of revised instructions the quantity of coal received by Central Railway Administration was reported to be less than the invoiced quantity by 5 per cent to 12.5 per cent during the period May 1984 to April 1985.

8.47 In order to achieve the full loadability of the wagon, the Railway Board instructed the South Eastern Railway Administration, in February 1984, to ensure loading in heaps (above the brim) by the collieries. As the

problems faced by the consumers continued an inter-ministerial meeting between Department of Coal and Ministry of Railways and Central Electricity Authority was held in August 1984 to sort out the problems relating to loadability, method of loading, weighment, etc. It was pointed out that there were no prior consultations with the consumers before introducing BOXN wagons. It was decided that trials would be conducted by Railways, Coal India Limited and representatives of Power Houses and Cement Controller. These trials have not been conducted so far (July 1985).

8·48 However, in June 1985, the Railway Board notified that the minimum weight for charge for both steam coal and slack coal loaded in BOXN wagons should be the marked carrying capacity (58·3 tonnes) with effect from 15th June 1985, when loaded from collieries in the north and south Karanpura coalfields of Eastern Railway and from all coking coal washeries. The minimum weight for charge in respect of coal loaded from other collieries was continued at 55 tonnes and 54 tonnes for slack coal and steam coal respectively.

8·49 Meanwhile, reports continued to be received from consumers about short receipt of coal in BOXN wagons. The Gujarat Electricity Board pointed out (January 1985) that even with heap loading the actual quantity received in the Power Houses was only 50/51 tonnes in a wagon *i.e.*, 4 tonnes short of charged weight, presumably due to loss (spillage). It also pointed out that the trials agreed to be conducted at the tipplers of Power Houses had not been conducted by the Railways.

8·50 M/s. Tata Chemicals Ltd. had also filed a writ petition in the High Court at Jabalpur in 1983, stating that the South Eastern Railways had fixed the carrying capacity of BOXN wagon as between 58·1 to 58·3 tonnes in an arbitrary manner. They prayed that the loadability of BOXN wagon in respect of coal should be fixed at 52 tonnes and claimed refund of alleged overcharges amounting to Rs. 13·42 lakhs for the period from August 1983 to October 1983 and similar overcharges thereafter.

8·51 Coal India Limited also pointed out (May 1985) that even if loading up to the height and in the manner desired by the railways was found possible it was not safe to carry coal in that manner as such loading did not take into account the incidence of coal falling off en route thus constituting a loss not only to the consumer but also to the nation. The Coal India Limited also stated that a time bound programme should be laid down to carry out further investigations to decide once for all the policy to be followed by railways in regard to (a) the safe height and profile for loading coal in BOXN wagons, (b) system of loading—whether heap or level, (c) loadability with reference to density of coal and cubic capacity, (d) free time for demurrage for collieries and consumers, (e) collieries which should be supplied with BOXN wagons so that action could be taken to replace the existing weighbridges and (f) installation of weighbridges by the Railways.

8.52 As seen from the above narration the design of the wagon was deficient in respect of loadability for coal for which it was mainly intended to be used. The investigations which ought to have been carried out at the design stage and before introducing the wagon for commercial operation, had not been done. Even after 30 months of the wagons being in service the disputes and problems relating to loadability and free time for loading and unloading have not been resolved.

8·53 *Export iron-ore circuit :* BOXN wagons are also deployed in Hospet-Madras section and Waltair—Kirandul section for carrying ore for export. According to the RDSO, BOXN wagon was not suitable for carrying ore because the existing BOY design was capable of giving better service, better pay-load tare ratio, and saving in investment. Besides, iron ore terminals were designed to handle BOI and BOY type wagons of which there were adequate stock. The justification for introduction of BOXN wagons for transport of export ore is therefore not clear. On the Hospet-Madras section iron ore was being transported in rakes of 30 BOX wagons by single locomotive. The net pay load for two trains was 3500 tonnes. The BOXN train with 55 BOXN wagons utilising two diesel locomotives carries a net pay load of 3190 tonnes only resulting in wastage of loco capacity.

8.54 In fact, it was observed that on South Central Railway 6 to 9 trains constituting about 10 per cent of BOXN trains were run during the period April 1985 to June 1985 with 30 or less BOXN wagons with no increase in pay load per train compared to BOX trains.

8.55 Similarly, in coal traffic via Mughalsarai it was observed that during August 1985 to October 1985 the trains with 54 BOXN wagons or less constituted 9 to 17 per cent of the total BOXN trains. The running of underload trains further reduced the differential in pay load between BOXN trains and BOX trains.

8.56 *Steel Plant Circuit* : The introduction of BOXN wagons for carrying coal and ores to Steel Plants has been the most controversial subject. Though the Railway Board had held discussions with the Steel Plants and the Department of Steel from 1976 onwards at various levels Steel Plants did not agree to receive the BOXN wagons.

8·57 The main objections raised by them were :

(i) modifications to tipplers were expensive and though technically feasible, once the tipplers were modified other BOX wagons could not be dealt with the number of tipplers being limited at each Steel Plant it was not desirable to modify one or two tipplers to receive BOXN wagons thereby losing flexibility of operation.

(ii) BOXN wagons would have to be placed eccentrically on the tipplers creating uneven load discharge which was operationally unsound;

(iii) *lower capacity of BOXN and prolonged tippling cycle* : As the BOXN would hold only 51 tonnes of coking coal, as against 58 tonnes in BOX wagons the throughput per wagon would get reduced;

(iv) as BOXN wagons cannot be weighed on existing weighbridges Steel Plants have to go in for other types of weighbridges, Electronic in-motion weighbridges had not been standardised in India and their operation and maintenance costs were likely to be prohibitive;

(v) mix-up of BOX and BOXN wagons would involve additional detention of all empties necessitating extra free time allowance;

(vi) *unsuitability of BOXN wagons for loading steel materials* : BOXN wagons were not suitable for despatch of finished products from steel plants as most of the steel sections produced could not be accommodated in a BOXN wagon because of its shorter length. This would necessitate supply of empty BOX wagons for finished products creating more number of wagons to be handled by the Steel Plants.

8.58 The Kumaramangalam Committee (constituted by the Planning Commission) on handling of Railway wagons transporting bulk commodities in collieries, Steel Plants, Power Houses and ports, recommended (June 1983) categorically that BOXN wagons should not be commissioned in Steel Plant circuit. The committee further recommended that a self discharge (hopper) wagon was the most suitable for transport of raw materials to Steel Plants.

8·59 Because of the above factors the introduction of BOXN wagon in Steel Plant circuit was delayed. After discussions with the Department of Steel (December 1983), it was agreed that one tippler at Bokaro would be modified to cater to movement of iron ore (2 rakes per day) from Kiriburu and one tippler at Rourkela Steel Plant to handle one rake of washed coal per day. It was also agreed that conventional BOX wagons would be made available at Steel Plants for back-loading finished products and the question of free time allowance would be examined. Accordingly, BOXN wagons are being deployed in a limited way at the Steel Plants, Bokaro and Rourkela from July 1984 only. However, in view of their unsuitability for backloading, Railways have to make available adequate empties of BOX wagons. Thus the advantage of BOXN wagon expected in iron ore circuit by running longer trains would be more than nullified by running empty rakes consuming line capacity and involving additional expenditure.

Operational features and financial implications

8·60 Apart from the disadvantages arising from the design inadequacies loadability, consumer reactions, etc., the running of 4500 tonne trains consisting of BOXN wagons was also adversely affected because of the necessity and delay in development of infrastructural facilities. Even in respect of loading of coal, BOXN wagons could not be introduced in all collieries or sent to all Power Houses as the modification to loading chutes and tipplers had not been done.

8·61 At Bishrampur colliery BOXN could not be loaded because the loading chute was too low to permit loading upto carrying capacity. Supply of BOXN wagons was therefore, discontinued (August 1984). Similarly, at Bhojudih and Kargali washeries BOXN wagons could not be supplied pending arrangement for positioning wagons below the loading chute.

8·62 At unloading terminals, though according to the RDSO the wagon had been designed so as to eliminate modifications to tipplers, it was noticed that a recheck of the position by the RDSO in November 1983 showed that the BOXN wagon could clear only 47 out of 176 operational bogie wagon tipplers, even these with modifications to side support to accommodate the width. The cost of modification was estimated to be between Rs. 3 lakhs and Rs. 8 lakhs per tippler.

8.63 BOXN wagon had been designed to increase the throughput within the existing standard loop length of broad gauge track, loading density and other infrastructure without additional investment on these. It was expected that for running of 4500 tonne trains the existing infrastructure would be quite adequate; carriage and wagon facilities already existing would need to be supplemented only to the extent of providing air brake testing facilities; and no additional signalling works would be involved. The running of 4500 tonne trains, however, necessitated additional investments on track, signalling and strengthening of power supply in electrified sections and wagon maintenance facilities besides the need for additional locomotives as mentioned in the succeeding paragraphs.

(a) *Track works* : On South Eastern Railway provision of additional facilities on Kurampada-Bondamunda section costing Rs. 2.31 crores were sanctioned to meet amongst others the needs of operation of BOXN wagons also. Though on Western Railway also strengthening of track and bridges on Bhopal-Viramgam section estimated to cost Rs. 14.5 crores were found necessary, the proposals were not processed as it was possible to run the longer trains at reduced speed. The BOXN trains were therefore permitted to run at a reduced speed of 45 km. to

75 km. on various stretches with further reduction on bridges. The advantage of additional throughput, if any, was thus lost on account of reduced speed of the longer trains.

Further, it was also reported by Southern Railway Administration (September 1985) that the running of BOXN wagons on Renigunta-Madras section had caused increased incidence of rail fractures and weld failures besides other unsatisfactory features such as excessive rail wear, deterioration of wooden sleepers etc. The RDSO also observed (October 1985) that the BOXN wagons were already causing higher damage to rail wherever they were running both in rail failures and rail wear.

(b) *Power supply* : Though the concept of running longer trains had been under consideration from 1974, the RDSO stated in September 1982 that "it appears that additional substations would be required in between the existing sub-stations at practically all the places. This would also need further studies....." Accordingly, the Eastern, Northern and South Eastern Railways have taken up the works of providing additional sub-stations on the routes selected for longer trains at a cost of Rs. 46·60 crores. On the Northern Railway, pending completion of the work of providing additional sub-stations, it was decided (April 1984) that BOXN trains could be introduced on the assumption that not more than one train would be in the area of one sub-station.

(c) *Wagon maintenance facilities* : Though it was expected that the existing carriage and wagon facilities would be adequate and only air brake testing facilities would need to be provided, because of the incidence of large scale defects in bogies, wheels etc., the maintenance facilities had to be augmented. The Central, the South Central and the Western Railways had sanctioned works for development of maintenance facilities for BOXN wagons at New Katni Junction, Gooty and Vatva at an estimated cost of Rs. 1·98 crores, Rs. 1·18 crores and Rs. 0·58 crore respectively. The proposal to create maintenance facilities at Mughalsarai at an estimated cost of Rs. 4·08 crores is still (December 1985) under consideration.

(d) *Motive Power* : The Railway Board decided (August 1983) that the diesel locomotives (WDM2) should be fitted with air brakes to enable dual operation (with vacuum brakes as also air brakes) and future production of electric locomotives should be with air brakes. It was also decided that under no circumstances a multi-loco should be split up even though a single loco could haul 55 BOXN empties in the return direction. This decision about dedicated locomotives for a rake involved putting in additional locomotives exclusively for running BOXN rakes. For loading 10 rakes per day from Korea coal-fields to Western and Central Railways, it was assessed that 160 locomotives would be required giving 150 engine kilometres per day per engine against 400 engine kilometres per day per engine normally

laid down. Similarly, on the South Eastern Railway the additional requirment for Bokaro-Kiriburu circuit (4 rakes per day) was assessed at 20 locomotives.

Further, for a trailing load of 4500 tonnes, on certain important sections three locomotives have to be deployed. The comparative requirements of locomotives for BOX wagon trains and BOXN wagon trains on some important sections were assessed as under :

	BOXN (4500 tonnes)	BOX (3660 tonnes)
1. Karampura—Sonenagar	3 (2 WAM_2 banked by a single WDM_2)	2 WDM_2
2. Chopan—Chunar	4 (3 WDM_2 banked by one WDM_2)	3 WDM_2
3. Sonenagar—Tughalakabad	2 WAM_4	2 WAM_4
4. Rourkela—Chandil	3 $WAM_4$2 (with one banking engine)	2 WAM_4
5. *Chandil—Bokaro	3 WDM_2	2 WDM_2
6. Bondamunda-Hatia-Muri-Bokaro	3 WDM_2	2 WDM_2

*As the section Chandil-Bokaro is not electrified, the trains to Bokaro are run on diesel traction only.

On sections referred to at serial no. 2, 4, and 6 above BOXN wagons have not been introduced so far (January 1986). On other sections, it was understood that the number of locomotives for hauling BOXN trains were the same as for BOX trains.

The increase in payload is only of the order of 300 tonnes (net) in a BOXN train of 55 wagons compared to BOX wagon train of 43 wagons. Thus an additional locomotive is required even for a marginal increase in pay load.

8·64 The Railway Board also decided that each BOXN rake should have at least two brake vans to avoid reversal of brake van at terminals as well as for avoiding stabling of trains if one brake van was marked sick. Accordingly, the requirement of brake vans also went up and provision was made for acquisition of 160 brake vans in the rolling stock programme for 1983-84 besides conversion of existing brake vans for running with air brakes. It may not be possible to attach the brake vans fitted with air brakes to conventional freight trains with vacuum brakes.

8·65 Thus, the running of 4500 tonne trains with BOXN wagons entailed large scale investment in improvement of infrastructure on railways though the advantage gained in terms of relief in section capacity, increase in throughput, etc., was not appreciable. According to the RDSO, the impact on enhancement of line capacity would be felt only when

about 30 to 40 per cent of the total fleet operating on the concerned routes consisted of BOXN wagons.

8.66 in January 1978, the Railway Board had directed that a techno-economic study of various aspects involved in running of 4500 tonne train should be put up to them before undertaking series production. No such study was undertaken. Again in November, 1983 the Railway Board desired that the original financial justification of BOXN wagons should be examined and "considering that larger items of commodities may be of such specific gravity as not to give us the benefit of loading upto maximum carrying capacity whether this justification will still hold good". Without working out a financial justification though the running of BOXN trains involved huge investments as pointed out above, it was concluded that BOXN wagon possessed the potential for 4500 tonne trailing load with amenability to unloading by tippling for a large number of existing users. It was also concluded that for future projects a design of self discharge wagons for transport of coal could be considered.

8.67 An assessment of running cost of 4500 tonne trains made by Audit showed that for moving approximately 5·4 million tonnes of coal annually the running of BOXN trains would result in additional expenditure of Rs. 17 lakhs at 1983-84 costs besides additional investment in wagons (of about Rs. 5 crores) and other infrastructure.

Impact of manufacture of BOXN wagons on availability of other wagons

8.68 The production of different types of wagons during the Sixth Plan period (1980-81 to 1984-85) was as under :—

	Total production in terms of four-wheeler wagons
BOXN wagons	20852.5
BOX wagons	20110
Covered wagons	14878
Tank wagons	8312
Other special types of wagons (BHRT, BFK, BOBS etc.)	5123·5
TOTAL BG	69276
MG wagons	3350
NG wagons	402
TOTAL	73028

8.69 It will be observed that 30 per cent of the BG wagons were of BOXN type and 12 per cent were tank wagons. The excessive procurement of tank wagons and consequent idling of wagons was commented upon in paragraph 1 of the Advance Report of the Comptroller and Auditor General

of India for the year 1983-84—Union Government (Railways). The unnecessary production of tank wagons in the first two years of the Plan and the switch over in the subsequent years to production of BOXN wagons which move in closed circuit and have limited use appear to have affected the wagon availability on the Railways as could be gauged from the outstanding wagon registrations on broad gauge which were as shown below :—

31st March 1982	58038
31st March 1983	35056
31st March 1984	38959
31st March 1985	71570

8·70 *Summing up*

To meet the growth of bulk traffic in coal, ore, foodgrains by increasing the throughput the Railway Board directed the Research, Designs and Standards Organisation (RDSO), in September 1972, to design a new wagon. Accordingly, the RDSO evolved a new design of broad gauge wagon known as BOXN which was expected to permit handling of heavier freight trains of 4500 tonnes/7500 tonnes as against the existing freight level of 2500 tonnes to 3200 tonnes per train. The new design had incorporated several technical improvements which though expensive from first cost consideration were expected to give a 'zero defect' wagon in the sense that the wagon would require very little maintenance effort besides permitting higher speed and heavier loads.

BOXN wagons were introduced from October 1982 and 6260 such wagons were in service at the end of March 1985.

The following features were noticed in the development of design, performance, procurement and utilisation of BOXN wagons.

1. In January 1978 while approving the manufacture of prototype wagons, the Railway Board had decided that a study of the behaviour of prototype wagons and techno-economic study should be undertaken before commencement of series production. No such study was however, undertaken and the Railway Board placed bulk orders for manufacture committing the Government to an investment of Rs. 656 crores even before conducting the trials required and before the new design had been evaluated for technical and commercial acceptance. (Paras 8·3 to 8·13).

2. The in-service experience of BOXN wagons had shown that the expectations in regard to technical superiority of the design had been belied and the economic viability was doubtful. The higher speed (90 km per hour) was not achieved and the trailing load increased marginally. (Para 8.8).

3. The incidence of defects in bogies, air brakes, wheels, etc., was very high on account of design deficiencies (bogies), poor quality supplies, etc. As the design of the bogies had thrown up serious problems which did not lend itself for a simple solution the Railway Board decided to import six thousand bogies for trials thereby indicating that it was not prudent on the part of the Railway Board to have ordered bulk production of BOXN wagons without knowing the results of originally contemplated extensive trials with the new design. (Paras 8.16 to 8·26).

4. The procurement of inputs (such as bogies, wheelsets, bearings, air brakes, etc.) did not synchronise with the production of wagons by the wagon builders thereby resulting in large scale stabling of wagons leading to idle investment of Rs. 28.3 crores for a period of 2½ years besides escalation claims. (Paras 8·29 and 8·30).

5. In commercial operation the design of the wagon was found deficient in respect of loadability of coal for which it was mainly intended to be used. The use of BOXN wagons for loading coal to Power Houses, Steel Plants and Railways themselves gave rise to several disputes and problems regarding carrying capacity, unloading arrangements, unloading time and weighment of wagons, to which satisfactory solutions have not been found so far. Though the Railway Board had reduced the chargeable weight for coal from the marked capacity of 58·3 tonnes to 55/54 tonnes, the Power Houses continued to report short receipt of coal to the extent of 4 tonnes from the charged wieght, (Paras 8.38, 8·48 to 8·51). Steel Plants favoured a self-discharge wagon and stated that BOXN wagon should not be commissioned for Steel Plant traffic as its use required expensive modifications to tipplers and the wagon was unsuitable for despatch of finished products. (Paras 8·56 to 8·59).

6. It was expected that for running of 4500 tonne trains the existing infrastructure (track, signalling and maintenance facilities) would be adequate. This expectation was also belied. In practice, the running of 4500 tonne trains necessitated considerable additional investments on track, signalling, strengthening of power supply and additional wagon maintenance facilities. The estimated cost of such works undertaken is Rs. 56·7 crores. Besides, for running of 4500 tonne trains three locomotives have to be deployed on certain section even though the increase in pay load when compared with conventional trains was only marginal. The running cost of 4500 tonne trains for moving 5·4 million tonnes of coal annually

would result in additional operating expenditure of Rs. 17 lakhs as compared to cost of running of BOX wagons. (Paras 8·63 to 8·67)

7. The production of BOXN wagons which move in closed circuit and have limited use appeared to have affected the wagon availability of other types of wagons particularly covered wagons. (Paras 8·68 to 8·69).

APPENDIX II

(*See* Para 1·61 of the Report)

Comparative salient features of BOX and BOXN wagons in regard to design, payload, operational efficiency and overall utility and superiority and advantage of BOXN wagon over BOX Wagon.

(1) *Superiority of BOXN wagon over BOXC wagon.*

Advantage of BOXN over BOXC with regard to haulage of bulk consignments per train are as under:

	BOXC	BOXN
No. of wagons in 600 m train	44	56
Volumetric capacity in cu. m	68.59	56·3
Total volumetric capacity per train in cu. m.	3018	3152·8
Optimum payload density in kg/cu. m	810	1030
Track loading density in t/m	5·92	7·59
Permissible payload per wagon in t.	55·7	58·0
Gross permissible payload per train in t.	2451	3248
Payload at loading density of 810 kg/cu. m	2451	2554
Payload at loading density of 1030 kg/cu. m	2451	3248
Type of brake fitted	Vacuum Brake	Air Brake, Twin Pipe, Graduable Release type
Type of CBCs fitted	Standard CBC	High tensile CBC

(2) *BOXN advantages*

(i) Even at the lowest payload density of 810 kg/cu. m. BOXN carries 103 t extra payload per train

(ii) For the entire range of loading density (810 kg/cu. m.-1030 kg/c.n.m.) BOXN carries extra payload per train compared to BOXC from 4·1% to 32·5%.

(iii) With BOXC, full volumetric capacity cannot be utilised with loading densities above 810 kg/cu. m. without violating axle-load constraint, whereas with BOXN full volumetric capacity would always be utilised upto loading density of 1030 kg/cu. m.

(iv) For the same throughput, number of trains with BOXN wagons will be less compared to BOXC trains, thus releasing line capacity for increased throughput on Indian Railways.

(v) Owing to fitment of compressed air brakes of graduable release twin pipe system, BOXN wagon trains for long haul (4500t, 9000t, etc.) could be stopped within stipulated distances.

(vi) with fitment of high tensile couplers, longer trains of BOXN wagons could be hauled.

APPENDIX III

Statement of Observations and Recommendations

Sl. No.	Para No.	Ministry concerned	Observations/Recommendations
1	2	3	4
1.	1.8	Ministry of Railways (Railway Board)	The Committee note that as long back in March 1973 the RDSO had suggested that the inside body height of the wagon should range between 1950 mm to 2000 mm. It took 7 long years by the Railway Board and RDSO to finally approve the design. No satisfactory explanation has been given to the Committee for delay of this magnitude. This appears all the more strange in view of the sense of urgency displayed regarding manufacture and deployment of this wagon during the Sixth Plan period. The Committee deprecate inordinate delay in the approval of the design and would caution the Government to guard against such delays in future. The procedure, practice, and methodology involved in such a research and development project/require critical analysis and review followed by laying down of norms necessary to obviate any delay not to speak of such inordinate delay as occurred in this case.
2.	2.7	Do.	The Committee are constrained to note that the Ministry of Railways (Railway Board) placed orders on wagons builders in July 1982 committing the Government to a sum of Rs. 656 crores on procurement of wagons of a new design whose performance had not been evaluated by RDSO in utter disregard of an earlier decision taken in January 1978 by the Railway Board that a study of the behaviour of prototype wagons

3.	2·25	Do.

and techno-economic study should be undertaken before commencement of bulk production. In the opinion of the Committee it was most imprudent on the part of the Railway Board to have placed order for wagons without necessary trials and gaining service experience. It is all the more regrettable that even detailed reasons leading to this decision were not recorded in writing. The Committee cannot but strongly express their dismay over this highly unsatisfactory state of affairs in a project of such huge magnitude. What is further disquieting is that the Railways placed order on wagon builders totally disregarding the advice of the RDSO. The Committee deprecate that a matter involving huge expenditure of Rs. 656 crores was handled in such a casual manner and would like the Government to draw a lesson from this sad experience and ensure that such serious lapses do not recur in future.

According to the Railways the decision taken in 1982 to order series production of BOXN wagons without waiting for the results of prototype trials and detailed techno-economic study was vindicated by subsequent achievements in traffic lifted. Sadly enough, experience of working of BOXN wagons has belied the expectations in regard to technical superiority of the design as has been discussed in the succeeding paragraphs :

(a) After evaluation of the results the wagon was cleared in November 1981 for a speed of 75 kmph on track laid with 90 lb. rails. This was far below the design parameter of 90 kmph laid down by the Railway Board in January 1981. Even after further trials in April 1982 on better maintained track the wagon was cleared for 90 kmph in empty conditions only and it was

1	2	3

found that in loaded condition it was not possible to permit a speed of over 75 kmph.

(b) There is an increase in the rail fractures on sections where BOXN loaded wagons are running even though it has not been possible to attribute the increase in the rail fractures entirely to the running of BOXN wagons on the route.

(c) In addition, para 2·33 of the project Report on BOXN wagon specifically mentions that prototype testing and trials of the wagons to be produced will have to be comparatively more exhaustive as these would be a new concept, not tried out on Indian Railways before.

(d) The incidence of defects in bogies, air brakes, wheels etc. was very high on account of design deficiencies (bogies) poor quality supplies which did not lend themselves to simple solution.

(e) The wheel wear observed on the Casnub bogie is higher than that of the UIC bogie. In July 1984, RDSO concluded that the wheel wear rate in case of BOXN wagon with Casnub bogie would be twice as high than in the case of BOX wagon.

(f) The very fact that the Ministry of Railways have now decided to float a global tender for a modern bogie best suited to Indian conditions to meet its future traffic requirements is clearly indicative of imprudence in planning and implementation of a project of such a great importance and vast magnitude.

4.	2·26	Do.	The Committee is of the opinion that it was not prudent on the part of the Railway Board to have ordered bulk production of BOXN wagons without knowing the complete results of all prototype trials. While endeavouring to achieve immediate and short term objectives the Government lost sight of the long term perspective. The Committee fails to understand how the Railway Board decided on standardisation of CASNUB bogie before its performance was tried out under the conditions in our country. The very fact that the Railway Board is now on the search for a different type of bogie (22·3t axleload) is indicative of the fact that their earlier decision was taken in haste and was erroneous and unsound. The Committee have no doubt that all these factors are such as could have been monitored and controlled had the Government not acted in undue haste but had taken decision only after considering in depth the full implications of issues involved in long term interests of the economy. The Committee is constrained to comment that such hasty action became necessary only because the Railways had not moved expeditiously in finalizing, trying and approving the design of new wagon in the earlier years and had allowed a long time to pass through procrastination and lack of sense of urgency. The Committee hope that the Government would draw a lesson from this experience and will organise such future projects after taking adequate care and precautions. The Committee note that efforts are on to improve the performance of CASNUB bogie by carrying out modifications and also to improve the speed potential of the wagon. The Committee would like to urge that the Railway Board should monitor closely these efforts by RDSO in this direction. The Committee would like to be apprised of further developments in this regard.

1	2	3	4
5.	2·27	Ministry of Railways (Railway Board)	The Research, Designs and Standards Organisation (RDSO), an institution under the Ministry of Railways, carries out research, development and standardisation work in all the disciplines in the Railways. It also keeps the Indian Railways upto date in technical know-how relating to world-wide railway-oriented development and technology changes. The Committee is of the view that to keep pace with the fast moving changes in Science and Technology scenario in the world it is imperative that detailed knowledge of the latest developments in technology in the railway-related fields is acquired by RDSO and applied to the Indian Railways not only through technological quantum jumps but wherever possible through continuous incremental improvements. The Committee also desire that the RDSO should be equipped for upto date design activities and acquire the latest testing facilities on a short time bound programme.
6.	2.28	Do.	In order to have a proper appraisal of long term wear and tear effects due to fatigue, corrosion, etc. of track and vehicle systems the Study Group during their visit to RDSO, Lucknow was informed that a test track associated with a FAST Loop (Facility for Accelerated Service Testing) was being set-up at Mughalsarai and it was expected to be available within a span of about a year or so. It is indeed a sad commentary on the Railways R&D that it has still now no exclusive test track without which no proper research of the vital features of the behaviour of railway vehicles and rail lines can possibly be carried out. The Committee recommend that the Ministry of Railways (Railway Board) should appreciate the further facilities needed and competence required to be built up and take suitable and expeditious steps to revamp and restructure

7.	2·29	Do
8.	2·30	Do.

RDSO so as to undertake upgradation of technology in consonance with the changes that are taking place elsewhere in the world; that RDSO be so organised that it will be able to absorb at faster pace technologies relevant to the needs of the Indian Railways and apply the relevant technology with competence and confidence and thereby minimise the dependance of Railway on foreign sources for supply of essential raw materials and components.

The Committee are of the opinion that a perspective plan for research and development be drawn up for the next 10-15 years which should be reviewed every year in the light of performance and demand projections. It is imperative that serious and concerted efforts are made to acquire the latest technology from advanced countries, achieve breakthrough in know-how whenever necessary and to develop indigenous items at a faster pace so that self-reliance in Railway requirement is achieved expeditiously. Every effort should be made to ensure that time and money are not wasted on uncertain or obsolete technologies as has taken place in this case of BOXN wagons. RDSO should keep on examining and evaluating the existing state-of art technology and direction of future technology developments in various disciplines of Railways on a long term basis especially in production areas involving substantial investments of financial resources and a large volume of production.

The Railways have pointed out that there were a number of causes for the failure of UIC bogies under BOX wagons. The spring breakages has been attributed as the main cause leading to detachment of the wagon enroute. It is primarily due to very high overloading of BOX wagons upto 10-12 tonnes of excess loading. Box wagon has more volumetric capacity of 68·59 cu m. Since Box wagon was meant to carry a variety

1	2	3
9.	2 31	Ministry of Railways (Railway Board)

of bulk commodities, it was not supposed to be filled with each and every commodity upto brim level. For heavier commodities, the top level would have to be kept lower than the brim depending upon the density of the item. For instance in case of coal, there is loading line about one metre below the brim upto which 56 to 57 tonnes of coal can be loaded within permissible limits. With availability of more volumetric capacity, the overloading was more liberal in Box wagons. The Committee recommend that the Railways should review norms for commodity-wise loading in Box wagons upto certain level and enforce them strictly so as to reduce incidences of spring breakages on account of over-loading.

The Committee note that compulsory scrag testing of springs is done during overhaul of BOX wagon once in 4½ years. The preventive maintenance and periodic scrag testing the Indian Railways have adopted is based on practice of the Railway systems abroad. Since UIC bogies under BOX/BCX/BRH wagons employing laminated bearing springs, have to work under conditions much more ardous than in other countries in terms of track geometry and liberal overloading, the failure rate of the springs is high on the Indian Railways. The Committee note that the Railways did not change the Manual to provide for frequent scarg testing and preventive maintenance. The Committee suggest that norms for preventive maintenance and periodic overhaul should be reviewed so as to make such norms more appropriate under conditions obtaining in India and ensure that through their strict observance the wagons remain in proper working conditions.

60

10.	3.2	Do.
11.	3.3	Do.

*Para 2.31 and 4.23 of the Project Report.

Full speed potential of BOXN wagons in loaded condition can be achieved only after the track structure of the concerned routes are further upgraded to heavier than 52 Kg. rails i.e. minimum 60 kg. rails which is the next standard section after 52 kg. rails, continuously welded. CASNUB bogies fitted under BOXN wagon is based on design of the American three-piece bogie running on the American Railways for several decades despite its faster wheel wear propensity. In order to achieve higher speed potential and check in the rise of the incidences of rail wear and wheel wear, instructions have been issued that priorities may be accorded to use of 90 UTS rails on high density routes and BOXN routes.

The Project Report on BOXN wagon submitted by RDSO in September, 1974 specifically pointed* out that the work of introducing 60 kg. track on these routes (17 selected routes for BOXN wagons) should, therefore, commence straightaway and should be phased for completion over the Corporate Plan period i.e. by 1988-89. In January, 1981, the Ministry of Railways (Railway Board) decided that all open wagons in the 1981-82 RSP should be ordered as BOXN wagons. Bhilai Steel Plant is the sole supplier of rails to the Railways. Dialogue with Bhilai Steel Plant for production of higher UTS rails started as late as in 1982 and specifications were finalised in 1985.

The Committee are unhappy over the manner in which the Ministry of Railways (Railway Board) have proceeded in the matter for production/ replacement of rails with 90 kg./mm. sq. UTS. Consequent on the introduction of BOXN wagons in October, 1982, and its acquisition year by year. By open wagon fleet composes of about 25% BOXN wagons at

1	2	3	4
			present (1987) whereas replacement of existing rails by those of requisite standard is painfully slow, even though such replacement was recommended more than ten years back. Only K.K. Line (445 km.) has been relaid with new rails of 90 UTS. As estimated in the Corporate Plan (1985-2000) freight traffic to be carried by the Railways by 2000 AD is expected to go up from 220 MT in 1980-81 to 600 MT in 2000 AD i.e. around three times. To handel such a growing profile of rail-borne traffic, freight trains with much heavier trailing load would be necessary. The Railways propose to run on a selected number of high density and coal routes trains of even 7,500 to 9,000 tonne trailing loads. Most of the 17 routes selected for running of BOXN wagons fall in Groups A and B nominated for operation of high speed passanger trains at 160/130 km/h. Much of the rail traffic both highpassenger traffic as well as high density freight traffic using the same tracks is not considered desirable. The overuse of these dense traffic tracks reduced the general reliability of the Railway operational system. For this, the railway track would have, therefore, to be considerably strengthened and modernised. The Railways have also claimed that "there is no increase in rail fractures on rails of higher poundage." Track was already overdue for replacement and there is a limit beyond which the rails cannot be allowed to wear out without jeopardising safety. Most of the Railway systems abroad have already adopted heavier rail sections with higher UTS of 90 kg/mm sq. which are wear-resistant and have longer service life. As the track modernisation programme involves substantial investment of financial resources and a large volume of pro-

			duction, the Committee consider that renewal of tracks should be straight-away done with rails of 60 kg/m section with UTS of 90 kg/mm sq. This will not only ensure general reliability and improve productivity of the Railway system but will be also vital to safety and long term economy.
12.	3.4	**Ministry of Railway (Railway Board)**	The indigenous production of rails at present is of 52 kg. rails both in medium manganese quality and 90 UTS variety, whereas the Railways propose to import 60 kg. rails to be laid on important routes. The Committee strongly feel that Government should prevail upon the Bhilai Steel Plant to make special efforts for the indigeneous production of 60 kg rail of 90 UTS variety. This step will go a long way in the adoption of latest technology relevant to the needs of the country, reduce dependence on import and save precious foreign exchange.
13.	3 5	Do.	The Committee have been informed by the Ministry of Steel and Mines (Department of Steel) in March, 1988 that 60 kg rails are very much in the production capability of Bhilai Steel Plant. The firm long-term requirements of rails including that of 60 Kg 90 UTS rails were projected by the Ministry of Railways (Railway Board) to the Department of Steel/SAIL in February, 1987. The Committee deprecate that the Ministry of Railways (Railway Board) projected their requirements of heavier rails of higher UTS variety only in February, 1987 while the standards for track were reviewed long ago. While the Committee would like to be apprised of the further developments in this regard they would also recommend that in future there should be a close coordination and cooperation between the various agencies and decisions/agreements reached well in advance to ensure smooth and timely implementation of Projects.

1	2	3	4
14.	4·5	Ministry of Railways (Railway Board)	The average number of wagons stabled during the period October, 1982 to March, 1985 was 786 per month. This stabling, however, have increased to more than 2000 for March, 1986 every month till August 1987 leading to idle investment of about Rs. 100 crores at present day cost of wagon in one month alone. In the opinion of the Committee this is clearly indicative of faulty planning of wagon production. Moreover the phenomenon of stabling has been continuing right from the day the manufacture of BOXN wagons was commenced. Once the production targets were fixed it was the responsibility of the Railway Board to ensure procurement and supply of matching components to wagon builders for timely wagon production. The Committee deprecate that the Railway Board have taken four years to realise and that too after entailing considerable losses in idle investment, to gear up their planning mechanism as a part of their efforts to streamline the wagon production. The Committee hope that this step would yield better results and would like to be apprised of the impact of these measures in eliminating stabling of wagons. The Committee would like to know whether the Railway Board had imposed penalty on any supplier for delayed supply of inputs which caused stabling.
15.	5.12	Railways (Railway Board) Steel and Mines (Deptt. of Steel) Energy (Deptt. of Power and Coal)	The Committee note that in 1982, the Ministry of Railways (Railway Board) introduced modified BOX wagons called BOXN wagons. Immediately after the introduction of BOX N wagons in sizeable number, a number of representations were received from the bulk consumers such as Power Houses complaining about substantial shortages in the coal quantities received by them than the marked carrying capacity. They

also expressed their difficulties over the introduction of BOXN wagons which led to problems like weighment, loadability of BOXN wagons, loading and unloading time, unsuitability for finished steel products, modification of tipplers and lack of infrastructural facilities for handling full rakes.

The Committee is perturbed to note that the Secretary of the Department of Coal wrote to the Chairman, Railway Board in June, 1986 four years after the introduction of BOXN wagons, listing out the problems faced by the coal companies and according to him the Railways did not pay any attention to these problems. In their evidence before the Committee in December 1986, the representatives of the Departments of Coal, Steel, Power and Electricity Boards stated that some of the problems still existed. The Committee are now informed that remedial measures have been taken and all difficulties that user sector had apprehended are being resolved. The Committee deprecate the lack of seriousness and promptitude which the Ministry of Railways (Railway Board) have demonstrated in dealing with the problems of bulk users in time.

The Committee is of the opinion that the Railways had adopted a casual approach to these problems and have taken unduly long time in settling the disputes. Necessary investigations into the aforesaid complaints should have been carried out immediately when BOXN wagons were pressed into commercial operation and at this stage, the Committee can only express the hope that the Railway Board would have taken suitable lesson from this sad experience and would be responsive and considerate to users and would not allow this lackadaisical approach in dealing with such vital issues in future.

1	2	3	4
16.	5·13	Ministry of Railways (Railway Board) Steel and Mines (Deptt. of Steel), Energy (Deptt. of Coal), and (Deptt. of Power)	According to the Ministry of Railways (Railway Board), meetings were held between RDSO, Tippler manufacturers, Steel Plants and Port Trusts in October and December, 1982 for sorting out problems connected with the introduction of BOXN 's. The BOXN wagons was mainly intended to be used for transport of coal and iron ore, etc. These wagons were brought into service from October, 1982 and they were in sizeable number in WCL collieries by the end of 1983. Meanwhile bulk orders on wagon builders for manufacture of 16,400 BOXN wagons were placed in July, 1982. 6260, 10,380 and 13,263 BOXNs were in use by the end of March 1985, March 1986 and March 1987, respectively. Once a policy decision had been taken to go in for BOXN as early as 1982, and the concerned Departments had been apprised of the same, the Committee deprecate as to why move was not initiated by the Departments concerned to synchronise the required alterations and improvements. At present, about 16,500 BOXN wagons are in service. Simultaneous action which ought to have been initiated in time so that provision of infrastructural facilities such as modification of tipplers by Power Houses and Steel Plants, modification of weigh-bridges to enable weighment of BOXNs at certain colliery sidings and development of sidings fit to handle BOXN rakes both at collieries as well as at unloading terminals could have been provided in time. Importance of necessary infrastructural and operational facilities cannot be overemphasised. Economic and optimum utilisation of the transport capacity created in new BOXN wagon hinged on development of these infrastructural facilities. The Committee desire that

the Departments concerned should promptly provide these facilities wherever these are still lacking, within a time bound programme for intensive utilisation of assets created in BOXN wagons and optimisation of Railways productivity. The Committee would like to be apprised of developments in this regard. They would also like the implementation of these measures to be closely monitored and controlled with appropriate interaction between the various agencies involved.

17.	5·14	Railways (Railway Board)	The Committee also note that the designed loadability of 58 tonnes of coal in BOXN wagon was possible only with heap loading. The Coal India Ltd. has pointed out that such loading did not take into consideration the incidence of coal falling en route. According to Railway's own survey, the short receipt of coal by the consumer was to the extent of 5·1 per cent, though the extent of shortage attributable to spillage and pilferage could not be excluded. In any case the shortage is a significant loss to the nation. The Committee would like this aspect to be investigated with a view to taking appropriate remedial measures with due promptitude. They would also like to be apprised of further development in this regard.

Further, there is at present no weighment facility for BOXN wagons, the modifications to existing weighbridges or installation of new weighbridges are stated to have been taken up. The Committee are surprised how the Railway Board could embark upon such a venture, viz. introduction of a new type of wagon, without considering its effect on the consumers and the measures which they would be required to take including the loading time required therefor.

	2	3	4
18.	6·5	Ministry of Railways (Railway Board)	According to the Ministry of Railways (Railway Board), during the 4 years period after introduction of BOXN wagons, the BG bogie open wagon fleet (composed of 22% BOXN wagons and 78% BOX wagons) increased by 20·4% whereas revenue NTKMs increased by 50 per cent.
19.	6·6	Do.	According to Indian Railways Year Books 1980-81 onward during 1976-77 the tonnage lifted was 212·6 MT, an all time high. The subsequent years, however, witnessed a declining trend upto 1979-80 when it plummetted to just 193 M.T. As a result of the adoption of certain managerial decisions and operating innovations, it become possible to reverse the declining trend and from the year 1980-81 onwards the freight traffic witnessed steady growth.
20.	6·7	Do.	The more important managerial decision and operating innovations included—segregation of wagons fitted with roller—bearings and centre buffer couplers from the conventional type of wagons, organizing of separate rakes for movement of bulk commodities like foodgrains, fertilisers, cement and coal, identification of over aged and unfit wagons and their condemnation, introduction of end-to-end running of through goods trains from the originating station to the terminating station by-passing intermediate marshalling yards, movement of close circuit rakes to meet the demands of major customers, disciplined management, intensive monitoring of freight movement, use of BOXN type wagons, conceptual shift from wagon loads to train loads to otpimise use of rolling stocks and freight operations, utilisation of high capacity wagons, more modern locomotives and installation of improved signalling devices. All these

			measures have cumulatively contributed to the higher level of efficiency and better mobility.
21.	6·8	Do.	The Committee is of the opinion that achievement of the Railways in the movement of freight traffic as claimed by the Railways is not mainly due to introduction of BOXN wagons only.

MGIPF 227 LSS/88—23-7-1988—1050