INTRODUCTION

- On Indian Railways the traffic costing was introduced in 1962. Since then methodologies for costing of goods and coaching services have been developed. Traffic costing is a continuous process requiring regular updating of the results and refinements of existing method.

Cost Analysis

- The aim of Cost Analysis is to relate expenditure to the physical outputs responsible for these cost. This is done by first identifying all cost for the production of a particular output. A sound accounting system is a pre requisite for conducting accurate Traffic Costing. The classification of accounts which has been revised w.e.f.1.4.1979 is activity oriented as well as object of expenditure is more helpful in costing.

- The costing of rail transport is different from the costing of other commodities & services. It has many special features which create complex problems in the process of costing.
- Within the passenger & goods traffic, a vast number of services like carriage of passenger of diff classes, luggage, parcel, pantry car, RMS etc. are rendered.
- It requires vast assets with a long span of life. The cost depends on the effective utilization of assets.
- Same assets are being utilized for rendering a variety of services, the costs are common to a number of services have to be apportioned between those services.

Applications of Cost Data

- Management tool for tariff fixation.
- The data is used for rate fixing as well as planning & investment decisions.
- Class-wise profitability of passenger services.
- Economics of Selected Commodities
- Costing of special trains.
- Losses of Coaching and Freight services.

Essentials for Sound Traffic Costing

- Detailed System of Classification of Expenditure
- Reliable Statistical Data

TRAFFIC COSTING AND RAILWAY ACCOUNTS (contd)

Revenue expenditure is classified as under:-

S.No.	Abstract	Particulars	Demand for grant
1.	A	General Superintendence & service	03
2.	B	Repairs & Maint.of Permanent Way & Works	04
3.	C	Repairs & Maint. of Motive Power	05
4.	D	Repairs & Maint. of Carriages & Wagons	06
5.	E	Repairs & Maint. of Plant & Equipment	07
6.	F	Operating Expenses-Rolling Stock & Equipment	08
7.	G	Operating Expenses – Traffic	09
8.	H	Operating Expenses – Fuel	10
9.	J	Staff Welfare and Amenities	11
10.	K	Miscellaneous Working Expenses	12
11.	L	P.F., Pension and other retirement benefits	13
12.	M	Appropriation to Funds	14
13		Dividend to General Revenue	15

TRAFFIC COSTING AND RAILWAY ACCOUNTS

Further Division of Abstracts

Minor head
Sub-head
Detailed head

Revenue Expenditure incurred is thus booked under more than 1200 detailed heads of accounts.

Initial accounts are maintained by various accounting units attached to Divisional offices, workshops, zonal headquarters etc. The expenses are booked either directly from cash transaction or from adjustment vouchers which record the classifications.

TRAFFIC COSTING AND RAILWAY STATISTICS

1. Traffic Costing relies on Railways statistics for Basic Data about Railways performance.
2. The statistical data is published in the form of “Annual Statistical Statements” (ASS) every year.
3. Instructions for collection and compilation of ASS and other data are available in the Manual of Statistical Instructions Volume I and II.
4. Railway statistics – Broad classifications

(a) Financial Statistics
(b) Commercial Statistics
(c) Operating statistics
(d) Administrative Statistics

TRAFFIC COSTING AND RAILWAY STATISTICS (contd)

Financial Statistic(Statements 1 to 7)

These give details of financial results such as capital at charge, working expenses, gross earnings, gauge-wise break up of expenses, etc.

Commercial Statistics (Statements 8 to 15)

These give details of commercial performance like passenger and freight traffic carried and their earnings.

With respect to certain important commodities these give details like originating tonnage, earnings, average lead, etc.

Statement 15 provides background material for traffic costing and it gives the following information.

(i) Cost of hauling a coaching train and coaching vehicle per kilometer.

(ii) Cost of hauling a goods train and goods wagon per km.

(iii) Cost of hauling a tonne per km.

Separate statistics are also available for non revenue traffic in these statements.

TRAFFIC COSTING AND RAILWAY STATISTICS (contd)

<u>Operating Statistics</u> (16-37)

These contain data about important parameters like train km, engine km etc; which are used in traffic costing for apportionment of common expenses as well as for calculating unit costs for marshalling, terminal operations etc.

<u>Administrative Statistics</u> (40-44)

These relate to number and cost of staff of different categories and departments. It also gives details of man days last due to various reasons, accidents, statistics and cost of RPF and GRP etc.

Time Schedule Costing of Coaching and Goods Services

- Cap & Rev statement by Accounts Dept. - June
- Statistical statements compilation – September
- Unit cost compilation for Coaching and Goods – December/Jan (Rly Board)
- Escalation factor (Budget Estimate)

Stages of Traffic Costing

Stage 1

- Gauge-wise segregation of expenses.
- Direct allocation of gauge specific expenses.
- Common or joint expenses apportioned on the basis of certain ratios.
- The instructions for apportionment of joint expenses over different gauges booked under various Abstracts are contained in Appendix 1 of Instructions for compilation of Statement 30 in MSI (Volume II)

Stage II

- Exclusion of expenses pertaining to EMU services.
- Share of EMU expenses is worked out separately for all relevant Abstracts.
- The method of allocation of joint expenses between sub-urban services and other services are contained in Appendix II of MSI (Volume II) as a part of instructions for compilation of Statement 15.

Stage III

- Bifurcation of expenses of each gauge between coaching and goods services.
- As for as possible direct allocation under each Abstract to coaching and goods services.
- Proportion of expenses amenable to direct allocation <30%.
- Methodology of cost allocation between coaching and goods in accordance with instruction for compilation of Statement 15 contained in Appendix III (MSI Volume II).

COSTING OF COACHING SERVICES

- The expenditure pertaining to the coaching services (excluding EMU) follows the sequence of 19 stages of Division for arriving at the expenses on different facets of coaching services.
- Functional overheads are apportioned on pro-rata basis.
- Remaining overhead not directly allocable to any service is general overhead.
- General overheads are apportioned on pro-rata basis to arrive class wise cost are also shown separately.

- Running as well as terminal & overhead are consolidated class wise for passenger service, parcel luggage and catering service
- Compare with class wise earnings to arrive the profitability.
- Unit Cost
  - Passenger services

a. Terminal activities (booking, Ticket checking etc.)
b. Line haul cost (cost of traction, cost of transportation etc.)
c. Provision & maintenance of passenger stock

- Parcel, luggage & postal services

a. Terminal

b. Line haul cost including provision & maintenance of stock.

- Catering services

a. Terminal

b. Line haul cost including provision & maintenance of stock.

- Expenses so grouped are divided by the corresponding performance to arrive at the unit cost.

- Unit costs are worked out for various coaching services:
  - Overall unit cost of services including overhead
  - Overall unit cost of services excluding overhead
  - Unit cost of mail/express, passenger, parcel luggage, catering and class wise unit cost for mail/express passenger excluding overhead
  - Unit cost of ordinary, passenger, parcel luggage, catering and class wise unit cost for ordinary passenger excluding overhead

GOODS COSTING

- To allocate the goods expenses into certain physical operation such as running, terminal etc.
- Related exclusively to a particular function are allocated directly
- The common expenses are bifurcated between running and non-running activities
- Non-running activities is reallocated to the functions duly based on survey ratio.

Unit cost published by Board in two groups i.e. Group-A and Group-B.

- Group-A
  - Not specific to any traction
  - Line haul cost for carrying unit and pay load separately.
  - Overhead are included in each element of cost

- Group-B
  - Specific to traction
  - Line haul cost for various activities
  - Overhead are not included and shown separately as a percentage

Passenger Train Costing

- Specific train costing
  - Time consuming 3-4 months
  - Accuracy not commensurate
- Standard train costing
  - Simplified and instantaneous

Parameters for Standard Train Costing.

- Kind of service viz. Rajdhani/Shatabdi, Mail/Express, Ordinary.
- Length of haul i.e. total distance–Railway-wise & route.
- Transit time & Idle time at terminating stations.
- Number of trips per year.
- Gauge – Broad/Metre.
- Rake Composition – class-wise composition of train.
- Capital cost of each type of coach, power car, pantry car etc.
- Traction – Electric/Diesel.

Inputs for Train Costing

- **Name & number of the train**

- **Type of Service** : Whether Mail/Express or Super Fast or Ordinary.

- **Earnings per Trip**:- These are assessed on the basis of the actual or projected Occupancy. 100% earnings can be assumed for the purpose of finding out the profitability of a train at fully occupancy.

- **Distance in Kms.:** The actual lead of train is to be fed.

Inputs for Train Costing …contd

- **Engine Km :** This is required for distributing signaling cost.
- **Composition of the train:-**Number of coaches of each class should be taken into account as per rake composition.
  - Appropriate spares should be taken.
  - Used for working out Capital cost of rake for Repairs and Maintenance, Interest and Depreciation purposes.

Inputs for Train Costing …contd

- **Depreciation:** This is calculated on the Capital cost of rake using Straight Line Method.
  - Distributed pro-rata on trip time.
  - Trip time to include idle or lie over period at either terminal.
  - The formulae for working out the depreciation in the methodology is :

[(Capital cost of coaches – 10% of capital cost as scrap value) X No. of days per trip] / [25 years (i.e. life of coaches) X 365 days]

Inputs for Train Costing …contd.

- **Interest:** Taken at current rate of Dividend(now 4% p.a.) on the capital cost of rake as per RCC Recommendations.
  - Distributed pro-rata on trip time including lie-over.
  - The formula for working out the interest is:

    Capital cost of coaches X 4% X No. of days per trip / 365days

- **Repairs and Maintenance of Coaches:** This is taken at 10% of the total capital cost per annum.
  - Distributed pro-rata on trip time including lie-over.
  - The formula for working out the interest is:

    capital cost of coaches X 10% X No. of days per trip / 365days

Inputs for Train Costing …contd.

- **Vehicles Kms.:** These are to be separately calculated for Diesel and Electric traction in terms of four-wheelers.
  - **Diesel Vkm**.: Distance of diesel traction X number of coaches X 2
  - **Electric Vkm:** Distance of electric traction X number of coaches X 2
- **Train Kms.** Distance traveled by the train.

Inputs for Train Costing …contd.

- **Terminal Cost (per passenger originating)**: Worked out on the basis of number of passengers originating.
  - Class-wise Terminal Unit Cost per passenger originating are available at Unit Costs of Coaching Services.

Inputs for Train Costing …contd.

LINE HAUL COSTS:

- **Traction Diesel/Electric(per Vkm):** Distributed using Unit cost of traction per Vkm.
  - Available in the Summary of End Results of Coaching Unit Cost.
- **Transportation cost (Per Tkm.):** Distributed per Train Km.
  - Available in the Summary of End Results of Coaching Unit Cost.

Inputs for Train Costing …contd.

- **Track Maintenance (Per Vkm):** For Mail/Exp., the unit cost is Available in the Summary of End Results of Coaching Unit Cost at Annexure I.
- **Signalling cost (Per Engine Km.):** Available in the Summary of End Results of Coaching Unit Cost at Annexure I.
- **Escalation Factor:** This factor is utilised to bring the cost to the current year's level.
  - Available in the Introductory chapter to the Summary of End Results of Coaching Unit Cost

Inputs for Train Costing …contd.

- **Train Examination En-route**: This relates to cost of train examination. Applied as a fixed percentage on total cost.
- **Overheads**: Expenses which are not directly allocable to any service, and are applied as a percentage of total direct expenditure.
  - The overheads percentages are available at Annexure-I of the Summary of End Results of Coaching Unit Cost.

Inputs for Train Costing …contd.

- **Central Charges:** Expenses on Railway Board and Central institutions.
  - Applied as a percentage of the direct expenditure including overheads.
  - The Central charges figure are available at Annexure-1 of the Summary of End Results of Coaching Unit Cost.
- **Loss of path to Goods trains**: Added as a fixed percentage on total cost including OH and Central charges.
  - 2% in case Mail/Exp. trains
  - 8% in case of Shatabdi and Rajdhani type of trains

Parameters for Train Costing – Freight Trains

- Commodity
- Type of Wagon, Wagon turn-round
- Number of wagons per rake
- Tare weight
- Payload – loadability
- Lead
- Traction- Electric/Diesel
- Empty Return Ratio(ERR)
- No. of Terminals and Marshalling

Elements of Freight Costing

- Terminal Expenses
  - Documentation(*Unit Cost available in Frt unit cost*)
  - Other Terminal(*Unit Cost available in Frt unit cost*)
- Marshalling(*Unit Cost available in Frt unit cost*)

Elements of Freight Costing contd..

- Line haul
  a) Cost of Traction
  b) Cost of Other Transportation
  c) Cost of Track and Signaling

  distributed on GTKMs

  GTKM_Loaded=(Payload+Tare)*lead*No. of wagons

  GTKM_empty=Tare*ERR*lead*No. of wagons

  Total GTKM=GTKM_loaded+GTKM_empty

Elements of Freight Costing contd..

- Provision and Maintenance of Wagons
  - Unit cost is per wagon day
  - Wagon days worked out for each trip

  Wagon days are computed as:

  Wagon turn round x No of wagons

  WTR is available from FOIS
- Escalation factor

Limitations of Present Costing System

- Fully distributed cost
  - Variability of unit costs not scientifically arrived at.
- Aggregate costs at Zonal Railway level
  - Sectional and Division specific costs not available.
- Time consuming and very detailed

PROFITABILITY OF PASSENGER SERVICES (2011-12)

Figures in Crores of Rs.

Class	Expenses	Earning	Loss/Profit
1AC	477.82	439.04	(-)38.78
1st M/E	121.73	82.60	(-)39.13
2AC	2471.31	2032.48	(-)438.84
3AC	4096.27	4595.60	499.33
AC Chair	807.14	793.85	(-)13.29
SL M/E	13851.51	7319.76	(-)6531.75
2nd M/E	11751.84	7514.24	(-)4237.60
1st Ord	72.81	24.46	(-)48.34
SL Ord	462.95	93.70	(-)369.25
2nd Ord	12743.83	4268.31	(-)8475.51
EMU Sub&M	4834.03	2020.08	(-)2813.95
Total	51691.23	29184.12	(-)22507.11

THANK YOU