The final survey reports also include a detailed financial assessment on the project by calculating the FIRR – Financial Internal Rate of Return.

Financial Internal Rate of Return

In order to streamline and standardize calculation of FIRR across Indian Railways, an approach paper has been developed. The methodology explained in the approach paper is based on the Finance Code issued by Indian Railways and best practices being followed by Zonal Railways. This methodology is adopted while calculating Financial Internal Rate of Return (FIRR) for the projects at the time of preparation of the Detailed Project Reports for New Line, Doubling, Gauge Conversion and Traffic facilities. Associate Finance ensures that the guidelines set out in this model are scrupulously before being vetted.

Financial appraisal of a railway project consists following phases and inputs:

Construction Phase:
The following inputs are taken in the construction phase of the financial appraisal…

Asset development – The project estimate should be as economical as possible. The project cost should consider all incidental cost, inflation/escalation and interest, if any, as on the date of commissioning of the project. Project cost includes the following - Land Civil- Building & Bridges Civil-P way; Electrical; Mechanical Rolling stock & S&T costs. The estimate should be approved by the General Manager of the zone and vetted by the Associate Finance.

Interest and Inflation during construction – The project cost is generally arrived at the prevailing cost indices whereas the construction period lasts for longer period. Accordingly, inflation has to be factored in for the construction period. The WPI of a country captures over all inflationary impact and hence it is assumed that the project cost with WPI will give fair estimation. An escalation of 5% annually during the construction is recommended. Inflation should be considered from the second year onwards.

Rolling stock – In accordance with the Para 208 Finance Code Volume 1 if the line capacity work is undertaken on account of increase in traffic and in case there is a construction of new line then in such scenarios the project cost should invariably include cost of rolling stock. Procurement of initial rolling stock should be considered in the year of completion of the project. Requirement of rolling stock should be aligned to traffic projections. The project should also consider additional rolling stock as and when required to support projected traffic. The cost of rolling stock should be based on latest accepted rates (LAR).

Credit from Rail Released Material – In case of Railway projects which are brownfield in nature there are released material which lead to cash inflow to the projects. Same should be considered as credit to the project. CRRM should be shown separately while determining FIRR and should be considered in the year of realization of money. The CRRM should be estimated by the respective project team on best estimate basis.

Operation Phase:

The following aspects are assessed / used in the operation phase of the appraisal.

Earning Goods & Coaching – In case of the projects which results into additional revenue from goods/coaching, the same should be calculated based on traffic projections. The revenue for the first year of commissioning of the project should be calculated. Estimation of Goods & Coaching Earnings have to be worked out keeping in view the following points…

1. Outward traffic
2. Inward traffic
3. Cross Traffic.
4. Long distance traffic
5. Short distance traffic
6. Economic condition of the area
7. Agricultural development in the area
8. Industrial development in the area
9. Existing market in the area
10. Merchants and Govt. departments will also be consulted
11. Number of Coaching trains proposed in the project section.
12. Number of Coaches.
13. Carrying capacity of each coach/rake.
14. Number of trips proposed in the section.

Working Expense Goods & Coaching – The working expense related to goods and coaching are calculated on the basis of the benchmark rates published by the statistical department of Railway Board from time to time as available in Annual statistical statement (ASS). Estimate of Expenditure is made under the following main heads.

1. Maintenance of structural work
2. Maintenance of supply of locomotive power
3. Maintenance and supply of carriage and wagons
4. Expenses on traffic developments
5. Expenses on general developments
6. Expenses on electrical developments
7. Miscellaneous expenses

It is seen what would be the return after 6 years and 11 years which is known as productive test taking the life period of the line as 30 years.

Detention Savings Goods & Coaching – The projects related to line capacity work leads to savings in detention time of rolling stock. This saves cost of procurement of additional rolling stock. Accordingly, these savings should be accounted for while appraising the project. Saving should be calculated based on latest available Annual statistical statement (ASS) as published by statistics department of Railway Board from time to time.

Asset replacement – The assets deployed during the project have certain useful life. These assets are expected to last for useful life. Accordingly, the replacement of any asset should be considered only on expiry of its useful life.

Terminal Phase:

It is the final phase of the financial appraisal in which the following points are taken into account…

i. Project life should be considered as 30 years from the date of Commissioning as per Para 345 of Indian Railways Engineering Code.
ii. At the end of the project life cycle project cash flow considers the residual value of the assets. The residual value of the asset should be the balance useful life of the assets if available.

Terminal value other than land, preliminary and earthwork/formation should be based on useful life of assets and terminal value of land, preliminary and earthwork/formation should be the actual cost incurred on these items. Terminal value of replacement capex should also be considered while calculating FIRR based on residual life.

Following standard assumptions are taken while calculating financial IRR.

1. *Growth Factor*: The Year on Year Growth factor for earning is considered 5% based on 30 year historical CAGR of average earning from passenger and freight per KM. The growth factor for expenditure purpose is 5%.

2. *Interest during construction*: Interest has to be calculated only for projects funded through EBR/IF.

3. *Project cost:* The cash outgo for the project should factor in inflation, escalation, interest etc. up to the date of completion. For the purpose of financial appraisal, the date of completion of the project should be 31st March of the financial year in which the project is completed.

4. *Replacement cost:* The assets should be replaced post completion of useful life and the replacement cost should consider inflationary impact of the asset value if any.

5. *Depreciation* – Some of the DPRs consider depreciation as cash outgo while computing IRR. Depreciation is a non-cash item and should not be considered while arriving at discounted cash flow and FIRR.

6. *Non-Fare revenue*- There are various non-fare revenues which will also accrue due to new development in the form of advertisement, rental income, retails etc. The cash inflows due to Non Fare Revenue should be factored at the time of preparation of DPR.

7. *Time series*: FIRR calculation should consider the cash flow for the period of construction and 30 years of operations. The operation period of 30 years should commence from 1st April of the year immediately after the financial year in which construction is completed.

8. *Reference rates*: The calculation under FIRR calculation considers rates and references from standard like Annual Statistical Statement (ASS), End result for Freight, End result for coaching and All India Engine Hour Cost. Likewise, EIRR (Economic Internal Rate of Return) is also calculated for assessing the projects. In this model, projects are evaluated beyond financial terms by including economic and social impact of the projects.

The final survey report including all the above, is submitted in the form of a DPR – Detailed project report to the appropriate authority on the basis of the cost worked out.

Detailed Project Report (DPR)

Detailed Project Report is required to be prepared for all works costing above Rs.5 Crore. DPRs are sent to Railway Board by Zonal/PSUs for appraisal and obtaining sanction of the competent authority as per the prevailing delegation of powers.

DPRs are submitted by DRM to Gati Shakti Directorate of Railway Board with Finance concurrence of Divisional Gati Shakti unit through PCOM/NPG and approval of GM. DPRs of inter divisional/inter Zonal Railways are submitted to Gati shakti Directorate of Railway Board by CAO/C with the concurrence of FA&CAO/C through PCOM and approval of GM.

Under Mission 3000 MT plan, many such capacity enhancement works are required to be sanctioned in near future for which DPRs are being prepared and sent by zonal railways to Railway Board. On acceptance of the DPR by the appropriate authority, the works are duly sanctioned and included in the IRPSM – Indian Railway Projects Sanction and Management system.