

Accelerated construction of New Lines/Doubling Projects

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Synopsis:

The most important role of a Project Manager is to mobilise the resources at his command in such a way that the project is completed in least possible time, and of course, in least possible cost. Uneconomically planned project takes longer time to complete as extra time is needed to spend extra money. To achieve this objective, he has to not only plan the project most economically, execution of work and resource mobilisation efficiently but also has to foresee the possible obstructions/hindrances and attend to them well on time. Disturbance in the flow of progress upsets the entire schedule of activities and also delays the projects. This not only increases the cost of the project but also accrual of benefits from the project is delayed. The 'ROR' projection gets upset and sometimes even the project may not be justified.

The Project Manager should regularly watch and review how the project is progressing and take 'mid course' corrective action as needed.

The article identifies some of the reasons delaying a project and deals with a few measures to accelerate construction of New Lines/Doubling Projects.

1. Reasons for delays:

It is extremely important to identify the reasons which may delay a project. While most of the reasons are to be resolved by the Project Manager there are many where higher offices, sister/other departments, and even State Governments are involved. The role of the Project Manager is that he pre-empts the reasons which may delay the project and takes up the matter with the concerned offices. Some of the reasons are discussed below:

- i. **Poor project planning-** Detail guidelines are available in the 'Engineering Code' which should be the guiding parameters for deciding and fixing project parameters, such as location and alignment of stations and its approaches, location of road crossings, gradients with a view to facilitate good 'haulability' as well as good drainage from the cuttings etc. Requirements of functionality, safety, convenience for users and economy of construction and maintenance are important considerations. For best decisions it is essential that good and experienced engineering mind is applied before finalisation of a project report. However, in last decade or so it is noted that the Railway has resorted to outsourcing for survey works for new line, doubling, grade separators works etc. where the agencies have no staff technically sound enough for such decisions. Often even the survey data are not correct. When the DPR is submitted to Railway, sadly enough, no technical mind is applied. This leads to wrong assessment of quantities for estimate/tenders requiring sanction of variation/ modification of drawings etc. extra expenditure for compensating for wrong technical

decisions, perpetual extra maintenance efforts and at the same time causing serious inconvenience to the users of the assets. Uneconomically planned project takes longer time to complete as extra time is needed to spend extra money. All these costs heavily to the Railway and the country at large in terms of cost over run, time over run, extra maintenance cost and compromise on functional and safety aspects.

- ii. **Fund uncertainties** - For want of committed fund flow for the entire project it is extremely difficult for the Project Manager to enter into full commitment with the vendors/contractors. Even the existing vendors/contractors hesitate to go 'full throttle' and finish the project in least possible time. Delay in payment of the bill is blocking up of capital and in this scenario the agencies go exceedingly slow, just to exist on the project if not seek closure of the contract. Uncertainty of fund flow makes Project Manager to plan small tenders. Small agencies have tendency of saving on unit cost by way of hiring cheap work force, equipments and substandard materials with poor progress rather than investing reasonably well on these and making profit on accelerated work with high quality standard.
- iii. **Non availability of site/drawing/decisions-** This is largely in the control of the Project Manager. This is the most common and important reason for the delay of a project. Though instructions exists not to invite tenders until all decisions, drawings and dear site are available, it is seen that contracts are awarded with deficiency in this regard. This not only delays the project but also the Project Manager runs high risks of contract management issues and chances of decisions/drawings getting biased in favour /against contractors. This may also lead to 'vigilance' case. Promulgation of new LA act has delayed the land acquisition for almost two years on some projects on ECR.
- iv. **Poor Law and Order situation-** almost all projects faces this problem in small or large proportions. However, in the states infested with organised crimes/Maoist activities the disturbance is very prominent and encountered too often. There are cases of large scale burning of construction equipments and machineries as well as injuring contractors' staff/managers. This not only delays the completion of projects but also jacks up the cost of project as the contractor has to account for cost of insurance as well as possible levies to be paid to buy peace at his site. The staffs deployed at site also remain under constant threat on life thereby reducing their output. The agencies also tend to cover up his slippages in the garb of such disturbances.
- v. **Wrong sequencing of activity-** Wrong sequencing of a activity or non parallel activity on a project delays it. Many times wrong sequencing of activity leads to "undoing" of activities partly or fully. It is therefore, essential that proper sequencing of activities along with as many activities as possible in parallel is desirable. In fact, arrangement of certain materials and T&P for activities should be ordered considering the lead time. Delay in arranging resources on time causes idling of men and machineries. Switching over

activities leading to dis-engagement of particular type of artisan staff gives major setback as those artisan staff takes up work elsewhere when rendered idle at one site.

At a major bridge site having approx. 35m tall piers the contractor completed the sub-structure from abutment no-1 end whereas the launching of Open Web Girders were planned from abutment no-2 end. This led to delay of almost 4 months involving a penalty of Rs 1lakh per week.

- vi. **Inadequate mobilisation-** This is largely in the control of the Project Manager. This is the most common and important reason for the delay of a project. The Project Manager do not take detail program and resources to be deployed activity wise, to complete the contract within prescribed DOC. This should be commensurate with the daily/weekly asking rate of progress. Inadequate fund allotment prompts agencies to go slow.
- vii. **Poor/Non understanding benefits of volume-** I would say that there is a 'hole' in the pocket of the contractor through which his 'profit' drops out continuously. Hence, it is essential that the contractor completes the work in least possible time if he wants to maximise his profit by reducing the period of his stay on a contract. I have noted 2% - 5% increase in profit if the agency is able to cut down the completion period of his work. This is substantial in disturbed areas where contractors have to pay to ultras for peace at site.

Now all types of construction machineries and plants as well as experienced/trained man power are available on hire/purchase from the market. Though it may cost extra but due to cutting down completion period as well as reduction in over head cost and per unit cost it increases the profit margin in absolute term for the contractor. It also saves time on the project for the department. The Project Manager has to drive this idea in to the mind of the contractors.

- viii. **Unqualified & inexperienced supervisor-** There is a saying that "quality does not cost". If the department is strict and enforces quality on the works, deployment of unqualified & inexperienced supervisor and work force will produce substandard works rectification /replacement of which will prove to be very costly money wise to the contractor and time wise to the department. Deployment of qualified & experienced supervisor and work force maintains the quality regime rigidly.

2. Remedies:

- i. **Financial uncertainties** – The Railways for the 1st time has now asked for a "blue print" of requirements of fund, rails, sleepers and also commitment for commissioning of sections on doubling, triple line and new line projects. This is in right spirit. Now the Zonal Railways can confidently plan their field organisation, work and make commitments for longer periods. This will make project management and contract management very smooth thereby cutting down idling time and the cost and time over runs. This will facilitate fixing big contracts who have their own 'QAP' and they know 'time value for money'.

- ii. **Non availability of site/drawing/decisions-** The Zonal Railways are now largely dependent upon out sourcing for preparation of drawings. This has inherent demerit of getting in experienced person for preparation of drawings who are not conversant with Railways' requirements and practices. This leaves many deficiencies in the drawings. The culture of awarding work to L-1 tenderer often make it so poorly paying that the person leaves the job and a new person have to be taught again. Often this chain continues.

Drawing is the 'language of engineers'. In field the quality and progress depends upon preparation and approval of drawings. It is therefore, essential that the Railway has their own staff for the purpose. Saving directly some money on this account by out sourcing proves very very costly by way of delay in completion of project as well as increased maintenance cost perpetually. If this is not possible, the out sourcing should be done for a longer period with well thought of schedule of item and eligibility/contract condition. Even for small value work "two packet system" may be adopted to eliminate non serious tenderers.

- iii. **Poor Law and Order situation-** In the state of Jharkhand ECR has posted an OSD/Project-cum-DyCSC/RPF for effective liaisoning with the State Govt. on this issue. Even armed policemen are stationed on some sensitive places and the project proceeds reasonably well. If big contracts are fixed, say in the range of Rs. 100 Crs. or more, the contractors are able to manage the situation of their own.
- iv. **Wrong sequencing of activity-** Correct sequencing of activity and parallel activities saves projects time and also cost. This is particularly essential to fix correct TDC of activities which are needed for next activities as well as when many agencies work at a particular area, e.g. one agency needs to complete tall major bridge abutments, approach slabs & launching of Open Web Girders and another contractor to complete backfilling, blanketing etc.

Similarly, in case of station building work activities may be planned in such a way that mason's work should not discontinue for doing RCC work at plinth/lintel band, chhajja and roof slab etc. Infact, base concrete for floor may be done immediately after plinth is reached which helps a firm base for props for RCC roof slab. Chajja may be precast. Brick work for a room may be completed and given for shuttering work and both activities progressed at different locations so that mason's work is not stopped. Ordering for doors/window frames and leaves may be placed when the brick work reaches plinth level so that completion is not prolonged.

It is further elaborated in case study discussed in para-3.

- v. **Inadequate mobilisation-** Completion period for any activity can be very precisely projected based on average daily progress for a week. If it is not as per the TDC the additional resources may be worked out by simple mathematics of weekly 'asking rate' x deployed resources ÷ average daily progress. But often we conveniently get befooled by agencies.

- vi. **Poor/Non understanding benefits of volume-** The Project Manager should explain simple idea that every man deployed by agency earns him some money. If he wants to earn more money per day he has to deploy more men. Same applies to all other resources.

On SWR when I was CE/Con, due to some compulsion, the work of ballast supply was awarded to a contractor whose monthly capacity was only 2,500 cum as he used only his own 3 trucks. The asking rate was of the order of 22,000 cum per month. When I explained him the above mathematics he hired trucks from market, lowered his per truck profit but ultimately earned huge profit in smaller time duration.

- vii. **Unqualified & inexperienced supervisor-** The contract condition prescribes the level and scale of experienced engineer and manager that a contractor has to deploy. If any unqualified & inexperienced supervisor/engineer is deployed, the Project Manager has the authority to prove it and order for his replacement.

- viii. The project Manager should deeply involve himself in project management as is expected of an engineer. He and his team of staff and officers should understand the contract conditions, specifications of works and enforce the QAP of Railway/approved by Railway. He should also keep in mind the psychological aspects of human resource at his disposal.

3. Case study:

Often it is seen that in case of earthwork, blanketing and bridge work the contractor adopts a sequence of progress in which even after spending 75%-80% of contract value no stretch is ready for taking ballast or P.Way materials. Thus, in a way the some spent is locked up. Ideally it is essential that the contractor completes a workable stretch and hands over to Railway for next activity. With this in mind, the total work content in various stretches should be studied and stretch-wise TDC be fixed with penalty clause. However, in this condition the Project Manager also binds himself with the condition of providing all drawings with CRS sanction etc well on time. If he is successful in doing so even by delaying inviting tender by few months he compensates more than enough by having all drawings/decisions on time as well as introducing parallel activities. This brings tremendous confidence amongst bidders and they tend to quote lesser rates.

One such exercise was when I was CE/C/SWR and now similar TDC incorporated in a tender for earthwork, blanketing and bridge work for doubling between Garhwa Road-Ramna (32.5Km), a High Priority Work. Sample is placed below:

STRETCH		Distance (Km)	No of Minor Bridges to be extended	No. LHS to be constructed on doubling alignment	Target for handing over of completed works to Railway
From (Km)	To (Km)				
33.78	33.00	0.78	1		within 12 week from issue of LOA
33.00	32.00	1.00	1		within 12 week from issue of LOA
32.00	31.00	1.00	2		within 14 week from issue of LOA
31.00	30.00	1.00	1	1	within 14 week from issue of LOA
30.00	29.00	1.00	2		within 16 week from issue of LOA
29.00	28.00	1.00	7	1	within 22 week from issue of LOA
28.00	27.00	1.00	3	1	within 24 week from issue of LOA
27.00	26.00	1.00	0		within 24 week from issue of LOA
26.00	25.00	1.00	2		within 26 week from issue of LOA
25.00	24.00	1.00	3		within 28 week from issue of LOA
24.00	23.00	1.00	1		within 30 week from issue of LOA
23.00	22.00	1.00	3		within 32 week from issue of LOA
22.00	21.00	1.00	1		within 32 week from issue of LOA
21.00	20.00	1.00	3		within 34 week from issue of LOA
20.00	19.00	1.00	4		within 36 week from issue of LOA
19.00	18.00	1.00	2		within 38 week from issue of LOA
18.00	17.00	1.00	4		within 40 week from issue of LOA
17.00	16.00	1.00	6		within 44 week from issue of LOA
16.00	15.00	1.00	4	1	within 48 week from issue of LOA
15.00	14.00	1.00	6		within 52 week from issue of LOA
14.00	13.00	1.00	3	1	within 54 week from issue of LOA
13.00	12.00	1.00	3		within 56 week from issue of LOA
12.00	11.00	1.00	2	1	within 58 week from issue of LOA
11.00	10.00	1.00	2	1	within 58 week from issue of LOA
10.00	9.00	1.00	3		within 60 week from issue of LOA
9.00	8.00	1.00	3	1	within 62 week from issue of LOA
8.00	7.00	1.00	2	1	within 64 week from issue of LOA
7.00	6.00	1.00	1		within 66 week from issue of LOA
6.00	5.00	1.00	1		within 68 week from issue of LOA
5.00	4.00	1.00	0		within 70 week from issue of LOA
4.00	3.00	1.00	1		within 72 week from issue of LOA
3.00	2.00	1.00*	0	1	within 74 week from issue of LOA
2.00	1.00	1.00	1		within 76 week from issue of LOA
1.00	0.40	0.60	0		within 78 week from issue of LOA

Note : A penalty @ ½% of the cost of work in a particular stretch will be imposed for each week or part thereof of delay in handing over of the stretch to the Railway fully completed.

* This stretch has important bridge of 2 x18.3 m +16 x 30.5m hence kept at the end.

4. **Conclusion:** I am of the firm opinion that the best technical mind should be applied at survey and DPR stage. The project parameters should be fixed keeping in mind the requirements of functionality, safety, convenience for users and economy of construction and maintenance. The project Manager should deeply involve himself in project management as is expected of an engineer. He should understand the contract conditions,

specifications of works and enforce the QAP of Railway/approved by Railway. He should also keep in mind the psychological aspects of human resource at his disposal. If these are enforced the project can be completed in least possible time and cost.

5. Photographs of some of the poorly planned/executed works which delayed project due to rectification are placed below:



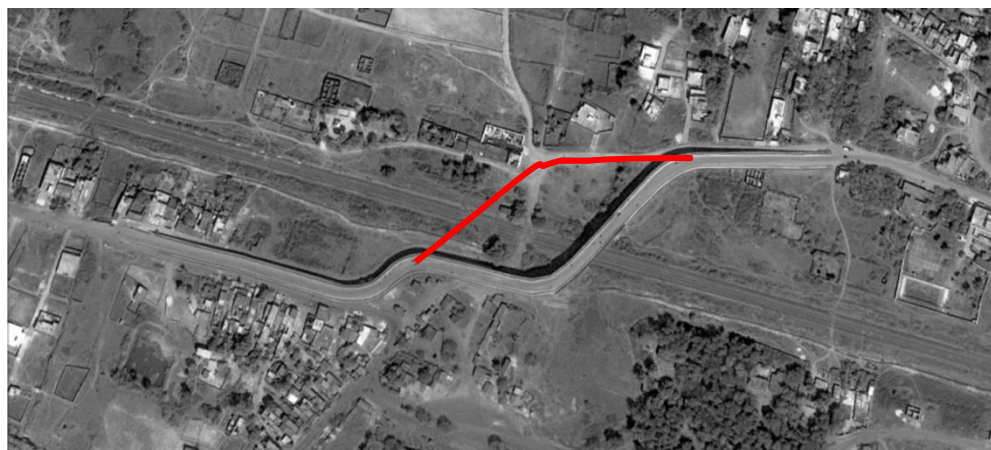
Side drain- higher than formation level



Jamua station- in deep cutting- serious drainage problem due to water oozing out from formation (photo- Jan'15)



Poorly designed & executed cutting required rectification



Poorly aligned ROB- 100m longer so costlier than needed with extra curves impairing visibility and safety for road users.

INSPIRING QUOTES

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1. Japanese proverb: - If he can do it, let him do it. If none can do it, I can do it.
2. God upsets our plans only to set up His plan for us. Because we see our present and plan our future. But, He sees our future and plans our present.
3. Success will never lower its standard to accommodate us instead we have to raise our standards to succeed. Remember, for every bird God provides food but not in their nest.
4. There will be plenty of time to sleep when you are dead. Life is only living. So wake up and perform it.
5. The best day of your life is the one when you decide your life is your own and you alone are responsible for the quality of it.
6. We may not achieve everything we dream but we cannot achieve anything unless we dream.
7. If you can't have the best, make the best of what you have.
8. Stress is like spice. In the right proportion it enhances the flavour of a dish. Too little produces a bland dull meal. Too much may choke you.
9. Success is not final. Failure is not fatal. It is the courage to continue that counts.
10. Don't be afraid to make a mistake. But make sure you don't make the same mistakes twice.
11. I do not know if success gives happiness, but I do know that a happy mind can lead to mighty success.
12. An excellent thought about life. Listen to everyone and learn from everyone because nobody knows everything but everyone knows something.
13. Water in the ocean can never sink a ship unless it gets inside. All the pressures of your life can never hurt you unless you let it in.
14. Champions are not super natural. They just fight for one more second when the others quit. Sometimes, that one second of effort gives you victory.
15. Life is a question nobody can answer and death is an answer nobody can question.
16. If you fall, don't see the place where you fell, see the place where you slipped. Success is all about correcting your mistakes.
17. If one day we were put to exchange all our troubles across the table, after few moments, each one would silently take his own and leave.
18. Some people say that dreaming gets you nowhere in life. But I say you can't get anywhere in life without dreaming.
19. A sweet relationship is like a pillow –when tired, you sleep on it; when sad, you drop tears on it; when angry, you punch it; when happy, you hug it.

20. When wind blows strongly, some build walls for protection while others build windmills to generate energy. Attitude creates the difference.
21. Every problem in life carries a gift inside it. So whenever you lose something, don't get upset. Because something big or good may wait for you more than you lost.
22. We tend to forget that happiness does not come as a result of getting something we don't have. But rather recognizing and appreciating what we do have.
23. Life is all about a card game. Choosing a right card is not in your hand but playing well with your cards determines your success.
24. Prayer is not a time to change God's mind. But, it is a time to allow God to change our minds. Pray today for a beautiful mind tomorrow.
25. Possibility or impossibility does not depend on the size of our goal. It is on the size of our faith. Keep faith to make everything possible.
26. Doubt creates the darkest moments in your first hour while faith brings the finest moments in your darkest hour.
27. In the company of wind dust achieves great height but when mixed with water it becomes mud. Always choose right company.
28. Sea is common to all. Some takes pearl, some takes fishes and some come out with just wet legs. The world is common to all. It's up to us to choose what we want.
29. The ladder of success is never crowded at the top. The competition is only at the bottom. There is always a vacancy at the top. So aim high.
30. Man – How do you make such beautiful idols from stone?
Artist: Idols are already hidden. I just remove unwanted stones.
Happiness is hidden, just uncover it and feel.
