

Hyperscale Network Modernisation

Fibre Roll outs in India

1. The information age

Today we are living in, what we can call, the Information age. Communication technologies are not only shaping connectivity and knowledge but are also influencing cultures. Now we are sitting at the cusp of another revolution in the communications industry – the rise and rise of fibre. Both Governments and service providers are investing in dense fiberisation in backhaul and last mile connectivity.

India’s per capita fibre consumption of 0.10 fkm, compares poorly to that of China at 1.14 fkm

2. Network evolution and the role of fiberisation

As the world gravitates towards deep fiberisation, India still remains underpenetrated on fibre deployment. India’s per capita fibre consumption figures of 0.10 fkm, compare poorly to those of China at 1.14 fkm. To bridge the digital divide and actualise the ‘Digital India’ vision, India needs to get fiberised at an unprecedented pace.

Telecom revolutions, riding on microwave technology, have shaped the past two decades in India. Now the balance is shifting towards wireline heavy networks and convergence of wireless and wireline especially in the form of fixed wireless access (FWA) technologies. Fibre penetration in the network value chain has been restricted to backbone networks. As we move to the hyper-connected 5G era, networks would need more fibre.

Fibre Across Network Value Chain

	Infrastructure				Access or last mile		
	Undersea cables	Core network	Metro network	Backhaul (FTTT)	Enterprise	Small businesses	Homes & retail premises
Used for	International transmission	National transmission	Domestic transmission	Tower connectivity	Office premise connectivity		Retail connectivity
Dominant technology	Fibre	Fibre	Fibre	Microwave	LTE / Fibre		LTE / Copper
Alternative technology		Copper	Microwave	Fibre	Copper/ VSAT/ Wi-max/Fibre		Fibre / Wi-max / Wifi
Fiberisation imperative for networks of tomorrow							
Why fibre		Fiberisation imperative for networks of tomorrow	High reliability and uptime	High bandwidth and demand scalability	High bandwidth, future proofing and reliability		Multiple end points, high speed triple play services, high scalability

3. Challenges and complexities in fibre roll outs in India

Hyperscale network modernisation starts at the very beginning – the physical layer of fibre roll outs. Fibre imperative notwithstanding, fibre roll out projects, especially in India, are ridden with numerous complexities. Infrastructure roll outs in India are impacted by factors such as:

- Unplanned cities
- Ad hoc, un-synergised project roll outs
- Dominance of unorganised players
- Approval bottlenecks

These factors translate into unique challenges for fibre roll out projects. Slow pace of fiberisation can potentially impede critical digital inclusion projects in India.

The Cost of Slow Paced Fibre Roll Outs

5G access technologies are hinging on backhaul fiberisation

Next-gen home broadband experience is completely fibre dependent

Big data, Industry 4.0 – the next growth drivers, hinge on fiberised network



The vision of smart cities cannot be realised without deep fiberisation

Large scale projects like financial inclusion, require fibre intensive networks

Without fibre, rural-urban digital divide cannot be bridged

A detailed view of complexities in hyperscale fibre roll out projects

3.1 Multiple approvals

Right of way is one of the most crucial yet overlooked issues faced during fibre roll outs. Right of way issues can not only delay, but can potentially derail the projects as they have a trickle-down effect on the entire process.

Following are the factors making this process a tough one to crack:

- Multiple agencies and touchpoints
- Improper agency mapping during route planning
- Lack of clarity on jurisdiction for both granting authority and dispute settling authority
- Re-work on applications post joint route survey with RoW authorities
- Re-routing applications to correct authorities (in case of incorrect mapping)
- Administrative bottlenecks for mobilising approvals
- Stretched timelines for forest authority's approval (Reserved and protected forests)
- Dominos effect of the delay on work schedules in terms of equipment, cost and manpower planning

3.2 Improper surveys

Accuracy of survey data is the defining factor in roll out planning exercise. Several studies have outlined disruptive effects of rework in complex projects.

Currently, conventional survey techniques like visual survey, local inputs and intermittent boaring are prevalent.

Strata survey

- To define the type of soil – normal, soft rock, hard rock or mix soil
- Type of soil in-turn defines the trenching depth and kind of machines to be used – JCB or HDD, JCB poclain or Poclain rock breaker
- Machine output defines the time, cost and complexity of the trenching process

Inaccurate strata survey can have an impact on all the project deliverables including time and cost overruns, improper trenching and compromised fibre performance.

Correct view of existing structures and utilities

- No databases or identifiers for existing utilities like gas pipelines or existing cables
- Half-baked mapping of all specifications of in-line structures like bridges, culverts, canals, railway crossings and petrol pumps

Sub optimal utility survey can impact the trenching schedule and also lead to ad hoc and below par navigation approach for existing structures.

3.3 Unskilled manpower

Often, in a space dominated by unorganised vendors, manpower capability is overlooked. But having unskilled manpower on the ground, compounds the complexity of fibre roll outs manifold.

- Non adherence to defined SOPs defeats the purpose of meticulous planning
- Limited project management skills
- Non adherence to safety guidelines

Unskilled workforce can prove to be a productivity drainer, resulting in 50% less productivity.

3.4 Manual planning and tracking

Meticulous day and front wise planning is critical to productivity and meeting timelines. Not paying enough attention to how the activities are planned can derail the project.

- Legacy networks are a deterrent to clean slate planning
- Fibre deployment process has a lot of moving parts and externalities such as manpower supply gap, regulatory issues

- Oversights at the planning stage can lead to issues like deployment of wrong machinery, no contingency plan for festive season manpower shortage
- No real time updates from the execution site further add to the problem

Manual planning and tracking is one of the most important challenge that needs to be countered for effective roll outs.

3.5 Legacy operations management

Due to the complex and immature ecosystem, there are multiple challenges in the implementation phase

- People based machine operating procedures are prone to snags and delays
- No proactive time based reviews
- Manual reporting and non-availability of real time activity status
- Transactional choice of vendors and no investment in vendor team training

Till the time roll outs are characterised by the legacy way of working, these challenges will continue to hamper productivity on ground.

Multiple approvals

Improper surveys

Unskilled manpower

Manual planning and tracking

Legacy operations management

4. Cracking the fibre roll out code

Fraught with so many complexities, how can we achieve faster fibre roll outs for hyperscale network modernisation? India is ready for its digital revolution, but is the industry ready to outpace the global fiberisation to lead the way to 5G?

STL leads the way through the STL Way of fibre roll outs.

The STL Way represents the classic combination of:

- Deep fibre understanding
- Cutting edge technology
- Superlative service engineering
- The best people-process matrix

STL's unique LEAD360° approach to hyperscale network modernisation unifies the potential of highly orchestrated fibre roll outs, high density 5G ready fibre solutions and future ready software defined network design to deliver Smarter Networks.



4.1 LEAD360° – A Transformative approach to Hyperscale Network Modernisation

LEAD360° represents a paradigm shift in fibre roll outs for mega digital inclusion projects. **It is the STL way of revolutionising the fibre roll out process stage by stage, challenge by challenge.**

4.1.1 Lean agile approvals approach

To swiftly navigate through all the approval challenges, we have devised a new approach towards approvals. Lean agile approvals approach is designed to handle this externality in the most effective manner possible.

- Exhaustive route survey to arrive at the **correct list of RoW granting authorities** to avoid re-routing of applications
- **Sound RoW applications** factoring depth deviations, existing utilities to have first time right joint route surveys
- **Leveraging technology** to build approval processes and workflow system for automatic permission reminders
- Consistent **relationship building** and liasoning efforts with the regulatory stakeholders to overcome administrative bottlenecks
- Devising execution schedules tuned to the timelines of various approvals, so as to avoid time overruns during the implementation stages. For example – time taken for complex approvals like forest approvals should be factored in before operationalising the deployment plan

The ecosystem should persistently voice relevant issues to resolve the RoW issues in the long term. Persistent dialogue on the following issues is important:

- Fibre as a critical infrastructure
- Single window online clearances
- Utility corridors for fibre related excavations
- Using existing utilities as conduits for fibre roll outs

4.1.2 Everything survey

Comprehensive survey is arguably the most important step in the entire roll out process. **Everything survey - STL's unique approach towards surveys combines digital platforms and advanced survey technology.** The result is exhaustive route mapping and accurate soil strata classification feeding into a centralised database.

- **Online digital survey platform** enables real time capturing of the route along with geo stamped video. This leads to **direct digitisation** of the survey findings, saving both time and cost.
- Currently all structure measurements happen manually using a meter and tape. This is time consuming and prone to inaccuracies. Using this **advanced digital measurement tool**, critical dimensions like bridge length, pole height etc can be remotely measured and centrally stored

- Through real time digital tracking of the survey, **central tracking** becomes possible and provides a great governance mechanism
- **Modern survey techniques** like drone led survey, 360-degree photogrammetry can enhance the precision and speed of surveys
- **Soil strata prediction tool**, developed by STL as an industry first time method, uses a centralised repository of soil strata data to analytically predict the soil hardness. This is a marked improvement over conventional soil analysis methods like visual survey, local inputs or intermittent boring and brings much more predictability to the process
- A score of existing utilities that are interspersed across the route require special handling. The STL way of Everything survey ensures **100% compliance on predefined protection SOPs:**

- Navigating a culvert requires layers of protection such as GI (galvanised iron sheet) on the surface, PCC (protective concrete cement) and DWC pipe till standard depth, so that the duct integrity is maintained
- Gas pipelines are best handled basis depth analysis. Different procedures are followed in case of duct being placed above or below the gas pipeline
- Railway crossings, road crossings and river bodies are often navigated through horizontal drilling. Duct protection using DWC and PCC is mandated by the SOPs in case of specified depth levels

4.1.3 Academy training

Tech-led and innovative survey techniques surely enhance the efficiency and reduce fibre cuts and O&M costs. Another very important aspect of STL way of Everything survey is the digitisation and databasing of deployment routes, which will come in handy at every step of the network lifecycle.

With Academy training, STL is investing in capability building and certification of deployment professionals to lend more credibility and address productivity challenges.

STL Academy offers a 360-degree training and certification program on the best on-ground practices in fibre deployments:

- STL academy personnel are trained, skilled and equipped to handle on site contingencies in the best possible manner
- Skilling is done in collaboration with master trainers from all major OEMs
- Rigorous training on project management to encourage methodical execution
- **30% productivity** increase through training modules for machine operators and site supervisors

4.1.4 Design-led planning

STL academy training is bringing next-gen deployment expertise through a collaborative effort with OEMs. STL academy professionals are trained and certified on trenching, ducting, backfilling, blowing & splicing.

Design-led planning combines the power of innovation and activity level granularity to orchestrate the execution of large scale projects. It involves:

- **Intelligent network designing** through optimal route planning, 1+1 ring architecture, and optimum infrastructure availability
- **Professional project management** with skilled on site managers and state-of-the-art planning tools such as Primavera
- Exhaustive listing of and planning for all possible contingencies like geopolitical, social or even incidental risks
- **Task level rigor** and timeline tracking to ensure timely completion and seamless handover of the project
- **Day and front wise machine planning** addressing all the externalities like farmland activities (sowing) and strata input errors
- All factoring **manpower planning** taking into account, the types of machines, execution in no machine areas, festive seasons and vendor contingencies

4.1.5 360° Robust operations

Design-led planning plans for the smallest and biggest on site risks and is extensively focused on the main objectives of any project:

- Maintaining unconditional continuity – eliminating blind spots, creating redundancies and creating plan B
- Increasing day wise productivity – trenching speed, duct laydown, blowing efficiency
- Ensuring top notch quality with stage wise quality checks

Operations are at the core of delivering on the most challenging projects. Executional agility and effectiveness defines the SLA level performance and quality of the network. **360° robust operations is an approach where we have applied design thinking to the most granular aspects of execution.**

- **Mechanisation of daily operations**, although sounds simplistic but has far reaching consequences on the execution quality. This entails moving from people based to computer managed machine operations, using advanced tools and attachments to reduce man to machine ratio. One of the examples can be using a bullet rodder head to substitute manual cable pulling
 - **Automation in project tracking** using intuitive applications like Field Force Management System (**FFMS**) to bring efficiencies in on ground process like field scheduling, reporting, geo fencing and patroller monitoring
 - Creating and developing a **strategic partner ecosystem** based on scorecard based empanelment, capability building and meaningful engagement to ensure better management of vendor contingencies
 - The quality of execution is measured at an SLA level. Speed and quality of execution become most important when we speak about robust operations.
- Key technologies driving superior performance:**

- Using cutting edge machinery for trenching instead of manual trenching to get 10X efficiency
- Auto duct laying technology
- Customised attachments for machines and tools for maximum effectiveness

STL's 360° robust operations approach is supplemented with ZERO COMPROMISE approach on critical tests like:

- Even trench beds - depth audits
- Highly integral ducts - duct integrity and sponge tests
- Strong inlets and chambers - chamber tests
- Cable integrity in special deployments – protective procedures tests
- Seamless splicing – joint closure tests
- Optical parameters and LSPM (laser source power meter tests)

5. To conclude

The road to hyperscale networks is being built on the back of deep fiberisation and the pace and quality of fibre roll outs will be a game changer for India's the digital aspirations. A 360-degree revolutionary approach to fibre roll outs is necessary to make this quantum leap into the next generation networks. **STL's LEAD360° is a first its kind orchestration approach for hyperscale fibre roll out projects. It addresses a myriad of challenges in fibre deployment through innovation and disruption of status-quo.**

Keeping in view the importance, complexity and scale of fibre infrastructure expansion in India the need for visionary experts in fibre deployment space cannot be overemphasised.

STL is a leader in optical fibre manufacturing, innovative cabling solutions and expert network deployment

We can help you at each stage of your smart network creation through our expert design, build and manage capabilities



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