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Infrastructure Improvement in Border Areas

A Pragmatic Solution

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Infrastructure Improvement In Border Areas: A Pragmatic Solution

Introduction

India shares 15,106.7 km of its land boundary with six nations: Pakistan, China, Nepal, Bhutan, Myanmar and Bangladesh. The land boundaries with two belligerent neighbours, China and Pakistan, along its northern and western borders, have been a source of dispute, leading to a number of wars and border skirmishes.The existing state of road connectivity along the border areas has often affected the quick movement of troops when required, and its susceptibility to interdiction was noticed during the Kargil War.One of the reasons for the slow pace of construction and upgradation has been that the majority of the roads in the border areas are being constructed by a single agency.

India's border with Pakistan (3,323 km) is divided distinctly into three segments. The first segment is the Actual Ground Position Line (AGPL) which separates the two countries in the Siachin Glacier area; the next segment is the Line of Control (LoC), which extends from NJ 9842 to Sangam in Jammu and Kashmir (J&K); and the third segment is the International Boundary (IB) from the LoC endpoint till the Rann of Kutch in Gujarat. The terrain varies from plains and desert towards the southern edge of the border to mountains and high altitude areas in J&K. Having fought three wars with Pakistan, the defence infrastructure and the road network is in a highly developed state along India's western border.

The Indo-China border (3,348 km)is characterised by extremely rugged terrain,high mountain peaks and snow covered areas in J&K, Sikkim and Arunachal Pradesh. The area of eastern Ladakh bordering China is situated at an altitude of 9,000 ft. The heights in the region vary from 9,000 ft to 19,000 ft. Due to low temperatures and the altitude, the area is devoid of any vegetation—there are only small areas of vegetation along the river valleys. As there is almost no vegetation, vehicular movement is not restricted

to existing roads and tracks. Limited cross-country movement is feasible in large parts of the region. The two major rivers, the Indus and Shyok, form narrow valleys which are home to limited population centres and the roads generally follow the river course in the valleys. The terrain features in Sikkim are similar to those of Ladakh. The existing road network along north Sikkim runs along the Teesta river. Movement of vehicles is restricted to the existing roads due to the steep mountain ranges. The area adjoining the IB along north Sikkim is a flat plateau, which permits cross-country movement. As the plateau region extends more into China, the Chinese troops have the advantage of ease of movement upto the IB. The border areas of east Sikkim are dependent on the single road from Gangtok to Nathu La. The topography of the area precludes any cross-country movement.

The major feature of the topography of Arunachal Pradesh is the alignment of the Himalayas in the north-south direction, dividing the state into the five river valleys of the Kameng, Subansiri, Siang, Lohit and Tirap. The Siang river is joined by the Lohit and Dibang rivers in the plains of Assam and leads to the major river system of the Brahmaputra. The roads are aligned along either bank of the Brahmaputra river, with limited crossing places. Also, due to the configuration of the mountain ranges in the state, the roads have been constructed along the river valleys, precluding any inter-valley crossings. The area of Ladakh and upper reaches of Arunachal Pradesh are sparsely inhabited. Due to low population levels, the state agencies were not keen on development of infrastructure along the border. Hence, there is only a limited and rudimentary road network, primarily for sustenance of troops deployed in the region.

The terrain features in J&K, Sikkim and Arunachal Pradesh pose severe constraint on the construction of roads. Due to low temperatures, there are fewer construction hours and lower efficiency of equipment. The remoteness of the area increases the downtime of the equipment as repairs take a longer time due to non-availability of required spares in the local market. The harsh weather forces frequent turnover of construction crews. Environmental constraints lead to a longer construction period, and also the maintenance of existing roads is a challenge.

The lack of infrastructure has now become a major stumbling block in the quick deployment against Chinese incursions. Though India fought the 1962

War with China, it has since experienced a tranquil state along the border, except for a few incidents of troop incursions. The modernisation of the People'a Liberation Army (PLA) and rising Chinese clout make it imperative for India to be prepared for all contingencies against any Chinese designs. One of the most significant requirements in any such eventuality will be the availability of an all weather road network for speedy deployment and sustenance of the war effort.

The inadequacy of the available road network came under harsh criticism during the face-off with Chinese troops at the Depsang Bulge in the Daulat Beg Oldi (DBO) area of Ladakh in April 2013. The face-off incident highlighted the need for an all weather, robust road network all along the Chinese border, as similar incidents of troop incursions have occurred in Sikkim and Arunachal Pradesh also. With more border posts being created, especially along the Chinese border [54 new Indo-Tibetan Border Police (ITBP) posts are being constructed in Arunachal Pradesh], all weather surface connectivity is a must. The present slow pace of construction would result in a state wherein the major roads along the northern and eastern borders are not likely to be completed in the coming decade. The Border Roads Organisation (BRO) is responsible for the construction and maintenance of the road network along the border areas. The organisation has come in for considerable criticism from the security forces and the monitoring groups, apart from the Ministry of Defence, for the slow pace of construction.

One aspect that has irked the monitoring groups is that almost 50 percent of planned construction targets in the border areas is unlikely to be met in the stipulated timeframe. The BRO has been able to construct only 527 km of the planned 3,500 km of the strategic road network, the deadline of construction being 2012. The BRO is currently handling 471 key projects worth Rs 37,000 crore, whereas it can complete projects worth only approximately Rs 4,000 crore every year.[1]The Defence Minister has recently commented on the slow pace of road construction along the border areas and directed the BRO to fast track the construction work. The Defence Ministry also issued directives in September 2013 to engage public and private sector firms for road construction as the BRO had failed to meet the deadlines for construction of 73 strategic roads the along Indo-China border.[2]

The BRO has done yeoman's service since its inception in construction of roads in one of the most inhospitable terrain conditions. Working in small isolated detachments, its workforce has been single minded in the quest to provide connectivity to far-flung areas and has brought relief to the local population as well as members of the armed forces. However, in the last few years, the organisation has not been able to carry out the construction activity with the same professional ethos, and the slippages have impacted the speedy deployment to forward areas due to non-availability of a road network in the border areas. Earlier, a model of dedication and high levels of professionalism, the BRO's work culture has been affected by procedural and functional level inadequacies. The inherent flexibility of the organisation has been curtailed due to the number of directives disseminated to centralise the control and functioning of the organisation. The BRO has been in the spotlight for the slow pace of construction, its working methodology and construction practices have been questioned for the slow progress and the perceived differences between Army and BRO cadre officers that are affecting higher level functioning. Its functioning has also come under a greater scrutiny and has been adversely commented upon by the Comptroller and Auditor General (CAG) in its yearly findings. The CAG had questioned the slow progress, underutilisation of resources, faulty bridge designs, procedural lapses and financial irregularities.[3] It is essential to understand the major issues affecting the efficiency of this premier institution in its present state, as it adversely affects the defence preparedness of the country. This paper aims to analyse the current construction practices, the areas requiring attention and the suggested solutions to the current dilemmas being faced by the BRO.

Historical Perspective

The Indian Army had to secure a 15,000-km-long border at the time of independence. The remoteness and vastness of the northern and northeastern regions, coupled with the inadequate road network necessitated the raising of an organisation for speedy and quality construction along the borders. As state Public Works Departments (PWDs) did not have the capability to undertake construction on a large scale, it was envisaged to raise an organisation under the control of the central government for creating infrastructure in the border areas. With this aim, the BRO was created with the formation of the

Border Roads Development Board (BRDB) on May 07, 1960, for expeditious construction and maintenance of roads, with Pandit Jawaharlal Nehru as its first Chairman. The BRDB was mandated to ensure coordinated, economical and expeditious development of the road network by improving the existing primitive roads and partly by constructing new roads by an optimum coordination of the resources of various central and state agencies, including those of the armed forces. Given the low development of infrastructure in the border areas and nascent or non-existent state agencies, the BRO has done yeoman's service by constructing over 48,000 km of roads in the last 50 years. The development of the road network has not only provided the necessary deployment routes for the armed forces, it has also revitalised the local economy by providing connectivity to previously inaccessible areas and providing employment opportunities to the local population, thus, bringing about socio-economic development in the region. It has, thus, played a vital role in nation building and national integration. Today, the BRO is the largest construction organisation in the country, having a pan-India presence.

The BRO started operations with two projects, Project Vartak in the east and Project Beacon in the north. The organisation has grown considerably in the last 50 years, with a pan-India presence, apart from executing projects in Bhutan, Myanmar and Afghanistan. Over the years, the BRO has diversified from road construction to construction and maintenance of airfields, permanent bridges, office and residential projects and related civil engineering works in tunneling and hydro-electric projects, and transformed into a multi-faceted and a multi-dimensional construction agency. Today, the organisation has 18 projects with 35 task forces engaged in construction work, following the motto of *Shramena Sarvam Sadhyam* meaning everything is achievable through hard work or a simpler, We C*reate, Connect and Care*.

Functional Structure

The BRO is under the operational and administrative control of the Ministry of Defence with the Defence Minister for State as the Chairman of the BRDB. The BRO functions through the BRDB with budgetary support from the Ministry of Road Transport and Highways (MoRT&H). The BRDB Secretariat is headed by a Joint Secretary rank level officer and the BRDB exercises the financial powers of a department of the Government of India.

The BRO Headquarters, located in New Delhi, is the apex body, overseeing the functioning of the vast organisation.It is headed by the Director General Border Roads (DGBR), a serving Lieutenant General from the Corps of Engineers. The executive arm of the BRO, the General Reserve Engineering Force (GREF), is a blend of Army and GREF cadre personnel, organised into various projects and task forces. The BRO is a work charge organisation, implying that the pay and allowances of the personnel and other administrative costs are woven into the task being executed and included in the estimates. This aspect increases the per km cost of construction and is higher in many cases when compared to other organisations. The organisation has its own cost monitoring component, with officials of defence accounts co-located with the task force and project headquarters. The quality of work is regularly inspected by regional and chief technical examiners to ensure high standards of construction.

The basic working entity in the BRO is a Road Construction Company (RCC). It consists of functional platoons to execute specific construction activities like formation cutting, surfacing of roads, construction of drainage network along roads and small permanent bridges. Each RCC is headed by a Major/ Executive Engineer. The next higher echelon is the Task Force (TF). The TF typically consists of two to three RCCs, one to two pioneer companies, a workshop for repair cover and a supply and transport holding company, managing the store receipt and its distribution.Two or more TFs function under the administrative control of a Chief Engineer as part of a project. Bridge Construction Companies (BCC) are utilised for permanent bridge construction as well as to augment resources on an as required basis. In addition, the BRO has two base workshops to provide base repair facilities to dependent task forces.

The role of the BRO in war is to develop and maintain roads to keep the lines of communication open for the armed forces[4]. In peace, it is mandated to develop and maintain the operational road infrastructure of the General Staff (GS) in the border areas. The works executed by the BRO can be classified into two broad categories of GS works and Agency works.[5] The GS works include works executed as per the requirements of the Army Headquarters which are based on the ten-year GS roads perspective plan. Execution of the GS works is the primary task of the BRO. The Agency/ Deposit works

refer to the construction work carried out for different ministries of the central government. The deposit works are works undertaken for Public Sector Undertakings (PSUs), state governments and semi-state government agencies. Some of the works undertaken are surfacing and resurfacing of runways, construction of roads for the MoRT&H and MHA (Ministry of Home Affairs), construction of office and residential accommodation, schools and other construction projects, as required.

Project Execution Mechanism

It is essential to understand how a road project is planned and executed to have a clear picture of likely areas which may slow down the execution. Any project is conceived and assessed for technical feasibility and financial viability based on a long-term strategic requirement. The start point of any construction activity is the initiation of the requirement by the user, the local Army formations that project the requirement in their own chain of command. After approval of the work, allocation of funds and according priority of construction by the concerned directorate at the Army Headquarters, the perspective plan is communicated to HQ DGBR, and included in the BRDB work programme.After receiving the approval, the first step at the task force level is the conduct of a reconnaissance survey. It is carried out by the concerned RCC in whose area of responsibility the road is to be constructed. Then approval of the alignment is sought from the local Army formations/ MHA formations. After submission of the initial report, detailed estimates are prepared by the concerned task force and forwarded via the project headquarters to HQ DGBR for approval. The technical feasibility-cum-financial viability is ascertained at the project level and also by the concerned directorate at HQ DGBR before the work is sanctioned for construction. The construction activity commences only after receipt of funds from the user agency.

Actions to obtain necessary forest/ environmental clearances are also initiated in the intervening period. Proposals for land acquisition, if any, are forwarded to the local government authorities for speedy acquisition. The priority of construction is decided, depending upon the importance of the road for operational requirements. Priority over planned projects may be accorded based on the requirements of the user. The work is then included

in the Annual Works Plan (AWP) and the requisite resources are allocated for the work. The construction work is commenced by the local RCC and its progress is monitored at the task force and project levels. The progress of work and quality of construction is also inspected by the nominated technical examiner and his team. After completion of the work, the closure reports are initiated by the concerned RCC. After acceptance of the same at HQ DGBR, the financial closure is carried out and the work is closed. Funds are sanctioned after a period of three years for maintenance of the work. In an ideal scenario, the work must be completed in the planned timeframe. However, due to various internal and external factors, the progress of work is often delayed.

Challenges Facing BRO

The BRO is a departmental construction agency with a majority of its projects concentrated in J&K and the northeast. The present BRO work culture is manpower and equipment intensive. The remoteness of the construction location demands dedicated equipment, often resulting in a low usage rate. The quantum of work is affected by a limited working season, diversion of resources due to natural calamities and a high wastage rate,of both men and equipment. The pace of work is routinely affected by the slow pace of land acquisition, forest and other mandatory clearances and the indifferent attitude of the state functionaries. The present project execution philosophy, to include accounting procedures, financial controls and management practices, seems to be out of sync with the present day requirements necessitated due to the dynamic security environment on our western and northern borders as well as the increasing demands from the stakeholders for timely, high quality construction.

The prevailing construction practices of the BRO have faced stringent scrutiny in the recent years and it has been felt that time and cost overruns comprise one of the major management concerns for the executing agency. The challenges are both internal and external to the organisation. The internal contributing factors are low equipment utilisation, outdated repair procedures leading to longer downtime, underutilisation of integral technical manpower, under or non-utilisation of specialist construction equipment, incorrect estimations and faulty execution methodology. In a typical case,

construction of a 100 km road takes four to six years in the high altitude region, which is not acceptable to the user. The external factors have also, at times, contributed significantly to delays in road construction. Land acquisition has become a sensitive issue, and the delays in forest and wildlife clearances have made many a project a non-starter. Harsh and remote geographical conditions, combined with inclement weather prevalent in our border areas ranging from the rarified atmosphere of the high altitude areas of the Ladakh region to the heavy rainfall in the northeast, to the extremely hot climate in Rajasthan take a toll on man and machine. The rising costs of store procurement every year and diminishing availability of construction labour have also contributed to unforeseen delays.

Organisational Constraints

The BRO is a work charge organisation. Its entities generally have permanent locations, and the pay and allowances, alongwith other entitlements, are woven into the overall cost of the sanctioned work.There is a need to review the requirement of many entities within the border roads, as their utility has diminished, with local availability of resources and equipment. Many pioneer companies and base workshops may have become redundant to the overall requirement.

Role of the BRDB: The role of the BRDB is vital for timely construction of roads as it is the nodal agency for coordinating all aspects with other government departments. The BRDB was headed by the Prime Minister at the time of Independence. Presently, the Defence Minister for State is the Chairman and the day-to-day functioning is handled by a Joint Secretary level officer. It has been observed in the past that due to the present structuring, the requisite officers do not attend many crucial meetings and their subordinates are not aware of the requirements, which impairs the decision-making process, besides leading to unavoidable delays. The Internal Financial Advisor (IFA) has also been guilty of interfering in the technical examination of the projects which is not its domain and, thus, further delaying the sanctioning mechanism.

Employment of Resources: The task forces comprise the working component of the BRO. The work plan for each task force is approved before commencement of the financial year. The construction equipment

is generally is distributed to all the RCCs in an equated manner. During the working season, construction has to take place on all the planned roads and permanent bridges for completion of construction in the planned timeframe. Deployment of available resources on the planned construction activity within the task force leads to piecemeal deployment of resources over a widely dispersed area, achieving limited progress over the year. The need to achieve progress on all roads simultaneously leads to slower overall progress and longer completion time. The issue is further compounded in the high altitude/ mountainous areas where switching of equipment from one sector to another is difficult, given the short working season of five to six months. In a typical case, the six to eight heavy duty JCBs may be dispersed over a 500 km area in a task force, whereas a private company will be able to concentrate the numbers on a single road and achieve higher construction progress.

Induction of New Equipment: The fast pace of technological development has ensured that a better and improved version of the equipment is available within a very short timeframe. Presently, the demand for any equipment required is projected by the task force through the project headquarters to the DGBR. Many a times, the equipment procured centrally is made available based on the central procurement carried out by the HQ DGBR. A survey of stone crushing equipment in Project Himank in 2012 revealed that the latest equipment being inducted was a 20-tonne per hour capacity stone crusher. A private firm constructing a road for ITBP in the same sector was employing a 200-tonne per hour stone crusher. The difference in the work approach can be well appreciated. The task forces have also been lackadaisical in their approach while commissioning new equipment. The CAG Report of 2010-11 (Defence Services) showed that though six segregators[6] were procured for Rs 4.55 crore in 2006, two of the segregators had not been installed till 2010[7] in one of the projects, thus, leading to non-utilisation of expensive equipment. In an ironic twist, the segregators had been demanded and received by the project in 2006. The equipment was not installed in the next two years due to various reasons. It was then declared as surplus in 2008 and a case was taken up with HQ DGBR for their transfer to another project. The same was refused as the equipment had not been installed and the firm not paid the balance money.[8]

Work Approval Cycle: The time between initiation of the requirement by the user, initiation of detailed cost estimation to final approval and sanction of the work takes 15 to 18 months. Also, inaccuracies or inconsistencies in the estimate further delay the approval cycle. Given the timeframe, a 100 km road in a high altitude region would take six to seven years to complete from the time of initiation of the requirement.

Utilisation of Technical and Administrative Manpower: The task forces and the RCCs have a large pool of qualified and experienced technical personnel available as junior engineers and construction crews as part of pioneer companies. The soldiers of pioneer companies have worked in all types of difficult terrain conditions, judiciously utilising the available resources to complete their task. In the last few years, due to the greater availability of casual labour, a larger component of pioneer companies is being employed in supervision and administrative tasks, thus, underutilising a valuable source.

Functional Limitations

The procedures adopted by the BRO during any construction or tendering stage are akin to approved business practices followed by other government agencies. The entire spectrum of work execution and finances is subject to audit at various hierarchical levels. Given the remoteness of the areas where construction is taking place, the long supply chain and the dispersed location of the repair echelons, work is often hampered while rigidly following the laid down procedures. Functional level practical changes are required to provide greater freedom of action to the executive to consistently achieve laid down targets year after year.

Modernising Construction Techniques: The road construction techniques and methodology have undertaken a quantum jump due to the availability of modern construction equipment and new construction practices. Automation of many functions like heavy duty machines for preparation of a cohesive and uniform concrete mix, precision road laying equipment and many such innovative methods have led to reduction in construction time and fewer construction crews. The availability of heavy duty stone crushers with 200-tonne per hour capacity, on-site modern mobile labs, automated survey equipment and other such advanced equipment have simplified the task of the construction engineers while leading to high quality construction

in a shorter time. The BRO units, in contrast, are still following the older labour intensive construction practice. Every year, large numbers of casual labourers are hired for construction work. The task forces and RCCs are still working with relatively obsolescent equipment, resulting in low outputs and less availability of construction material. The shortfall is supplemented by manual labour, leading to comparatively mediocre quality of work. An existing practice followed in the Himank and Vijayak projects located in Ladakh, involves hiring of thousands of casual labourers from the Jammu region every year for road construction. The next logistics exercise involves their induction into the respective construction area, arrangements for their stay and de-induction before the closure of the road, due to extreme weather conditions in October/ November. The short working season of six to seven months is further reduced by a month. In a stark comparison of work practices, a private firm, working with a higher automated equipment profile, had employed only 80 labourers for road construction in Ladakh, whereas, the local RCC had almost five times the labourers for a similar stretch of road and was able to achieve limited progress.

Preparation of Estimates: The starting point of any construction project is the preparation of a detailed estimate laying out the technical parameters of the road, the cost factor, requirement of resources for construction to include machinery and manpower and, most importantly, the timeframe for completion of the task. Each task force and the RCCs have an in-house works section for the preparation of these reports. The first step is the detailed survey of the terrain through which the proposed road will be aligned. The data collection being carried out by the team of officers and junior engineers has to be precise and accurate. It has been experienced that many a times, due to pressing requirements of the higher echelons and time constraints, some segments of the estimation of earthwork are calculated based on experience and similar terrain assumptions. Errors due to inadequately trained manpower or working in harsh terrain conditions may lead to incorrect estimation. There is also a tendency at times to take a higher factor of safety to cater for any shortfall during the actual construction phase. Also, the present standard schedule of rates of the BRO is of 2009 vintage, which leads to an unrealistic assessment compared to present rates.

Significantly, given the time that elapses since the preparation of the estimates, approval and sanctioning of the work, normally, it is a different team that undertakes the actual construction work. Thus, the construction crews, many a time, have to forward amendments to the original work plan, resulting in lengthy calculations and explanations, thus, contributing to unplanned delays. This is unlike the civil sector wherein the same team usually undertakes both tasks. Unfortunately, it is not feasible to achieve the same in the BRO due to the constraints of tenures, given the difficult locations of the RCCs and the task forces. The construction time for a planned 138-km-long road in Ladakh was five years which had already suffered a two-year delay, thus, increasing the completion time to seven years. In comparison, a private firm constructed an 80-km road in two years with modern construction equipment and reliance on mechanised construction techniques.

Role of State and Local Functionaries: Speedy construction of roads is dependent on timely clearances from the local government. A number of projects have suffered alarming delays due to the delay in forest and wildlife clearances. These clearances have become difficult to obtain due to the stringent norms promulgated by the concerned ministries. The according of clearances in the time-bound manner within 210 days, as stipulated by the Ministry of Environment and Forests, is rarely followed. A third party assessment of the roads that are planned to be constructed through protected forests/ wildlife sanctuaries, even after obtaining the requisite state level clearances, has compounded the time delay. In many states, the supply of construction material is held up due to lack of timely allotment of quarry sites by the respective governments, citing environmental concerns and court rulings. These delays are not factored in by the user and the BRO faces the flak for the delay in construction. The process of land acquisition has also been slow, due to the opposition by the locals, who may also demand a higher compensation amount. Also, as many roads are located in the border areas, which have less population density, the electoral significance of these areas is minimal and, thus, does not impact the state functionaries. Therefore, according clearances for the construction of these roads is not a priority for then. A case in point is the construction of the Silchar-Lumding road. Due to the delay in according clearances, the construction of the road has been going on for the last 11 years. The central government has now eased

the norms for according clearances for strategic roads and this will enable construction in an earlier timeframe.

Human Element: The jawans of the BRO work in the most inhospitable terrain, staying in small isolated detachments in remote locations, with skeleton infrastructure while carrying out the road construction work. They can be routinely seen working in the most inclement weather conditions to keep the lines of communication open. Their dedication and commitment have enabled construction of roads over the most treacherous terrain, from glacial heights to deserts to the dense jungles of the northeast. As most task forces and RCCs are located in border areas, the soldiers are posted from one difficult area to another, thus, facing another hostile environment in the new location. Their misery is further compounded by lower pay scales and non-availability of incentives like special rations, as available to personnel of the armed forces, and even the central armed police forces. In many cases, since both organisations are co-located in the same area, the denial of many such concessions leads to resentment and dissatisfaction among the GREF soldiers. A similar dilemma has now occurred at the officer level where a section of GREF cadre officers are at odds with senior Army officers posted in the BRO, leading to a vilified working atmosphere. Recently, almost 50 percent of the mid to senior level GREF officers had made a written representation to the Ministry of Defence against the appointment of a senior Army officer as the DGBR at the behest of few senior GREF officers.

Procedural Restrictions

A large majority of BRO construction activity takes place in isolated and harsh terrain which has limited local resources in terms of availability of spares or civil workshop facilities. Procedural delays impact the working cycle due to non-availability of critical equipment during the working season. A review of the undermentioned procedures will lead to higher efficiency within the organisation.

Repair Cover: The existing repair cover to the RCCs is provided by the integral repair workshops with their detachments co-located with the construction platoons or the RCC HQ. The present established procedures state that when some construction equipment/ vehicle becomes unserviceable, the equipment is to be made serviceable promptly in case

the spares are available with the workshop or by canabalisation with a similar unserviceable equipment/ vehicle. The limited numbers of fast moving spares do not provide the requisite flexibility during the working season. In the event of non-availability of spares, the demand is placed with base workshops located at Pathankot and Guwahati for projects located in Jammu and Kashmir (J&K) and northeast India respectively. Sanction is given for local purchase if the spares are not available with the base workshop or if it cannot procure the stores in an early timeframe. The integral workshop then starts the process for local purchase. Following the laid down procedure, the earliest the stores can be made available is only after four to six weeks. Thus, the equipment has suffered a downtime of eight to ten weeks. This situation is unacceptable in the available window for construction given the inclement weather conditions in a majority of construction areas. The private firms are able to have the same equipment functional in three to seven days, thus, gaining valuable equipment availability. Also, many a time, spares of old versions of vehicles are received from the base workshops whereas the task forces may be holding a newer version of the same vehicle. The serviceability of the available vehicle and equipment is around 70 to 75 percent in most projects with the figures around 60 percent in high altitude areas.

Financial Control: Each planned work, after due approval, is assigned a job number and it gives out all technical details about the work, including the planned cost. The approved cost includes the pay and allowances, procurement of stores required for construction, rations, Fuel, Oil, Lubricant (FOL) cost, and so on. Expenditure up to a fixed percentage of the approved cost can be debited against each sub-head. Incorrect/ overbooking of expenditure under a sub-head while managing the expenditure within the overall allotment, leads to cost overruns near the completion stage of the work. Erring commanders have not been held accountable in the early stages, leading to unnecessary delays. The local audit office, co-located with the task forces has at times also been complacent, and ignored the early warning signs.There have been many instances of superfluous and trivial audit objections by the audit teams to pressurise the local units for undue gains. Also, at the HQ DGBR level, the role of the IFA is to keep a check on the fiscal expenditure of the planned construction activity. In the last few years, the offices of the IFA have been involved in the technical evaluation of the

planned work. This has undermined the role of the concerned directorates in the HQ DGBR, and also led to a dual stage approval of the planned work, leading to avoidable time delays.

Financial Irregularities: There has been an increase in the number of cases related to deviation from existing instructions while concluding contracts for procurement of stores. The deviations, whether deliberate or unintentional, have led to unavoidable delays in procurement of stores or buying faulty/ obsolescent equipment, leading to limited or no use by the recipient units. The result is slower road construction. The CAG Report of 2010-11 points to the misappropriation of construction stores worth Rs 1.67 crore by the contractor as requisite verification of credentials to include financial standing, business ethics and market standing was not carried out by Project Udayak before awarding a handling and conveyance contract to the contractor. Recently, on April 07, 2014, the Central Bureau of Investigation (CBI) court in Dehradun sentenced four BRO personnel and sent them to jail for supply of sub-standard construction material which was to be used in widening of the Joshimath-Malari road in Uttarakhand.[9] Work on many important roads is under intense scrutiny due to faulty construction, use of poor construction material and below average construction quality.

Changes Required

Reducing Quantum of Work

The quantum of work has increased exponentially in the last two decades to include works other than the primary responsibility of constructing GS roads. A large number of works like the Prime Minister's Reconstruction Package for J&K, Special Accelerated Regional Development Programme (SARDP) for the northeast and the MoRT&H works have led to a diversion of resources and shifted the focus from constructing GS roads, resulting in unacceptable delay in the construction activity in border areas. The increasing workload has led to a situation where the present quantum of GS roads to be constructed is beyond the capability of the BRO in the stipulated timeframe. This will lead to an 8 to 10-year delay in the construction of the planned GS roads which is not acceptable in today's

fluid security environment. Construction capacity enhancement by greater amalgamation by private firms or reducing the work load by focussing on strategic road construction may yield better results.

Timelines for Construction: The time required for construction of a road is calculated after undertaking a detailed survey of the area and factoring in the availability of all clearances. Mostly the year by which the road should be ready is mentioned, say, the project is sanctioned in 2012, with the road to be constructed by 2017 or so. In actual practice, however, the construction may start only in 2014 or 2015 due to the delay in obtaining clearances or availability of funds. Hence, the road is likely to be constructed only by 2019 or 2020, due to the late start. Unfortunately, the user remains fixated on the initial completion date, and lays the blame on the executing agency for the delay in the construction. The BRO must now start stressing on the time period of construction based on the month or year cycle, and not the date cycle, that is, the road is to be completed in 48 months after all the clearances are given and funds are made available, and not advocate completion by say, 2017, or any other timeline.

There is also an urgent need to lay down the priority of road construction sector-wise instead of peacemeal distribution of the work load on a number of roads, for the task force or the RCC. Prioritising the construction will enable concentration of more resources on the higher priority road, leading to faster construction. It will also meet user expectations.

Organisational and Procedural Changes

The civil industrial set-up was minimal in the Sixties when the BRO came into existence. There was an overwhelming necessity at that time to have the integral components of every Service such as workshops, pioneer companies, surfacing platoons and a permanent works platoon. As the BRO is a work charge organisation, all the integral components lead to a higher per km cost of construction. Today, with the availability of modern construction equipment with private firms and lower construction cost necessitated due to intense competition, a number of components can be reduced from the BRO. Also, private companies have started bidding for contracts in the hinterland. The cost and timely completion will become a deciding factor in deciding the awarding of contracts.

Pioneer Companies: The pioneer companies were supposed to supplement the non-availability of local labour in inhospitable border areas. Today, with easy availability of labour, and a high degree of mechanical efficiency, many pioneer companies can be disbanded to reduce per km cost of road construction. The necessity of maintaining a large component of pioneer companies needs to be urgently reviewed. A well thought out restructuring plan will lead to reduction of almost 30 to 40 percent of the pioneer companies which can be disbanded and the personnel offered adequate compensation.

Scale Down Base Workshops: The BRO has two base workshops, located at Pathankot and Guwahati. They provide base repair cover as well as spares to BRO projects located in north and northeast India. The workshops have outlived their utility in terms of providing spares for equipment and vehicles held with the task forces. Local workshops must be made responsible for the functionality of the mechanical fleet. The workshop officers and task force commanders must have total financial powers in this regard. A 20 to 30 percent off-road state of specialist equipment due to lack of spares, brings down the efficiency of the task force by a similar percentage. In contrast, a private company engaged in road construction would buy the required spares within two or three days to maintain its equipment.

Hiring Versus Buying Equipment: The BRO is currently holding only about 75 percent of its required equipment. Almost 25 percent of the equipment has outlived its useful life and needs to be downgraded or discarded. The procedural delays in procurement in 2011-12 led to the purchase of new equipment worth Rs 77 crore against a planned target of Rs 477 crore. This delay in procurement seriously undermined the planned construction targets. Hiring of equipment to offset the shortfall could not be fully exploited due to the limited financial powers of the project chief engineers who can presently hire equipment for a maximum of four months a year and up to a financial limit of Rs 50 lakh only. The powers of the DGBR are also limited to hiring equipment for a maximum of six months a year. This anomaly needs immediate rectification. The chief engineer who oversees the progress of work over a large geographical area, must have the power to hire equipment throughout the year, and financial power of at least up to Rs 5 crore.

Also, with greater availability of modern construction equipment with private firms, it may be more prudent to hire expensive specialist equipment which may have limited use throughout the year. Equipment that is not utilised to its laid down potential, leads to audit objections for the organisation. Hence, a system of hiring will be more cost-effective instead of maintaining a standing inventory and workforce. Another area of focus must be the cost factor of the operators. The pay of an entry level equipment operator in GREF units is approximately Rs 20,000. Taking into account, the cost of clothing, housing and food, the cost of one operator per month to the organisation is almost double his pay. Private firms offer skilled operators at Rs 12,000 to Rs 18,000 per month. Their work output is similar to that of the integral operators. The yearly variation in cost savings and increased work output is obvious. Also, the private road construction firms have the capability today to execute large scale projects. The tendency to split a planned road into smaller segments of 20 to 50 km while awarding contracts needs to be discontinued. Planning and advertising for the construction of a full length of road in a single contract will attract bigger firms involved in road construction. The accrued benefit for the organisation is faster quality construction in the planned timeframe.

Recommendations

Manageable Workload: According to an internal analysis carried out at HQ DGBR, the present workload of GS roads is almost six times the present capability of the BRO. And with the additional works of the Prime Minister's special package, SARDP, MoRT&H and other deposit works of the central and state departments, the BRO cannot execute the work in the timeframe required by the Army. Hence, it is essential that clear-cut priority be laid down, with emphasis on constructing GS roads as the primary responsibility. Other works can be redistributed to other construction agencies. Also, greater outsourcing of work is essential, with integration of major road construction firms in the work plan.

The BRDB must be able to assert the requisite authority with the various ministries for sanctions, clearances and availability of funds. Placing the BRDB under the Defence Minister may lead to better results. The construction of roads must be prioritised in every project and task force area of responsibility.

It will enable reallocation of resources to construct high priority roads in the sector. A greater interaction with the users is essential at all levels.

Downsizing the BRO: The BRO as an organisation stands at a cross-roads today. Delays in construction of strategic roads, increasing cases of fiscal mismanagement and friction between Army and GREF cadre officers are some of the reasons for not achieving planned targets. The organisation has to take radical measures to maintain its credibility.

- The first step would be to carry out an impartial assessment of the work capabilities of each sub-unit while taking into account its equipment profile. The cases for disbandment of surplus sub-units must be initiated on priority. A planned downsizing within the next three to five years will pay greater dividends.
- The willingness of a large number of private firms to undertake road construction in border areas makes a strong case for the BRO to focus on its core competency by reducing overheads, and ensuring quality construction in the planned timeframe.
- The functional abrasive atmosphere created due to a segment of GREF cadre officers has led to slippages of targets and, most importantly, a distrustful working environment. This sensitive situation requires a well thought out action plan. One approach would be to separate the two Services within the BRO, with specific projects having officers from one Service. One of the options could be a division based on geographical entities, like the northern and eastern projects, with one Service staffing one set of projects. The work ethics of the two Services and the targets achieved would be visible to all. Another option could be focus on permanently seconding serving Army engineer officers to the BRO to minimise cadre anomalies. The prudent approach would be to have a harmonious mix of the two Services so that the expertise of the GREF cadre officers and men is utilised effectively and the work is executed in a time-bound manner.
- The third approach can hinge on the logic that the BRO could concentrate on constructing strategic GS roads and be staffed by Army personnel only. A smaller work load will lead to a smaller, manageable organisation. This will help reduce a number of projects whose work load today can be undertaken by the state PWD. An option can

be exercised by the GREF cadre officers in case they are willing to continue within the organisation. Else, their services can be judiciously employed by relocating a few projects to undertake construction in the hinterland or in other areas having low infrastructure like the Naxal affected states. The alternative of their absorption into the respective state organisations can be explored.

Empowering the Executive: The powers to carry out any amendments to administrative procedures required during road construction should be vested with the chief engineer of the project. In present-day working, deviations, if any, from the sanctioned terms and conditions of any approved work can only be carried out by the concerned directorate at the HQ DGBR. Many a time, deviations are required due to change in equipment holding or non-availability of certain key resources which may have to be procured locally. Seeking the approval of the HQ DGBR leads to unnecessary delays, as queries and the replies to these waste precious working time within the financial year.

Greater Financial Autonomy: The financial powers of the chief engineers and task force commanders must be greatly enhanced. The project headquarters and the task forces cannot be dependent on other agencies, especially during the working season. With the co-location of audit officials with the project and task force offices, the requisite fiscal approvals as well as checks would be procedurally exercised. Given all the resources, it is certain that work output would be much higher in the same timeframe. The present financial powers of a chief engineer are Rs 5 crore for awarding contracts, which is a miniscule amount, when compared to the annual target. The same needs to be enhanced to at least Rs 50 crore for meaningful output in the working season. Similarly, the powers to hire construction equipment need to be raised from Rs 25 lakh to Rs 5 crore, while ensuring that no integral equipment remains unutilised. The task force commanders also need to be given greater financial autonomy for maintaining a fully functional equipment profile and have no dependence on base workshops for repair. A comparative analysis can be carried out by taking into account the financial powers of other public organisations like the Military Engineer Service (MES), Central Public Works Department (CPWD), and PWD, etc.

Educating the Users: The staff officers at various echelons within the Army must be made aware of the capabilities of the BRO. The user must have realistic expectations and not expect the BRO to construct roads in a shorter timeframe than planned. The technical aspects and requirements must be accepted and not negated as delaying tactics. Also, the user must be kept informed by the BRO functionaries of the likely delays and their impact on construction time. This is significant in hilly terrain or High Altitude Areas (HAA) as delays in obtaining clearances may necessitate starting of work in the next working season which amounts to a one-year delay. Due to the heavy criticism regarding the delay in construction of strategic roads, the BRO must lay greater emphasis on timelines for completing construction by quoting construction time in months, like 36 months and not the deadline, say 2018. Also, the user must be made aware that all construction activity will commence only when the requisite funds and clearances are made available. The time for construction must be calculated from the day actual construction begins and not when the sanction was awarded by the BRDB or when the user initiated the demand.

Another important aspect which needs to be highlighted to the user is the need to understand the basic technical parameters. A case in point is the induction of tanks[10] in Ladakh. The user requirement stated that the tanks will be carried on trailers towed by tatra trucks which require a larger turning radius than the flatbed carriers. The greater turning radius, easily executable in plains or deserts, is not possible in the mountains. The planned induction required creating larger turning areas, which increased the construction effort, leading to greater time and construction effort. If the equipment had been inducted on flatbed trucks, the turning radius would have been reduced from 40 m to 18 m. This would have enabled faster construction, leading to timely induction.

Delinking Pay and Allowances: The BRO is a work charge organisation, implying that pay and allowances are amalgamated in the sanctioned road construction cost. At the task force level, the RCCs and functional platoons are the only deployed construction element, but the pay and allowances of the task force offices, other support elements like workshops and supply holding units are also booked in various jobs. Pay and

allowances comprise a constant factor while the progress of the work may be hampered due to a short working season, non-availability of equipment, delay in obtaining clearances, and other unforeseen contingencies. This anomaly leads to a mismatch between the physical and financial progress which, at a later stage, results in jobs being overburdened, and initiation of revised estimates. The completion of the work is held up till the time the revised estimates are approved. The pay and allowances of the task force offices and support units should be delinked from the construction jobs and paid as per provisions of ground establishment funds, as is the practice for project headquarters.

Revision of Regulations: The inherent organisational flexibility of the BRO needs to be maintained and this can be achieved by taking into account the peculiar working conditions. The BR Regulations factor in such variables. Superimposing or comparing other departmental rates like those of the PWD or other agencies can lead to unrealistic cost calculations ultimately leading to delays in sanction and subsequent construction. Also, the officials at the state government and ministry levels have to be responsive for according timely clearances. The GS roads, due to their inherent importance, must be exempted from forest and environmental clearances. A two to three year delay in obtaining the requisite sanctions is unacceptable. Though a number of high powered meetings routinely take place, the response from the state government is generally not encouraging, given the reasoning that infrastructure development in the forward areas does not provide any tangible benefits to local functionaries.

Cost Per Km Comparison: The BRO planners also need to periodically carry out cost per km comparison with the National Highway Authority of India (NHAI), state PWDs and private firms. In many cases, the private firms offer better specifications than the BRO specifications, at a similar cost. Taking into account the longer construction time of roads by the BRO, engaging private firms for speedy road construction would be a necessity to achieve construction in the planned timeframe.

Higher Incentives: The greatest asset of the BRO is the undying spirit of the soldier who works tirelessly in isolated and inhospitable terrain. Unfortunately, he is also among the most poorly paid as compared to his compatriots in the other services. His well-being is an organisational

responsibility. Due compensation must be provided to the cadre personnel in terms of allowances and other benefits available to other services operating in the same area.

Conclusion

Transformation of the BRO is today both a necessity and a challenge: a necessity due to the archaic procedures, slipping targets and a dissatisfied workforce, and a challenge due to the strong resistance from within to change. The slippages in timelines for construction of strategic roads are not acceptable as this will have an adverse impact on the defence preparedness of own forces. Sweeping changes are required in organisational structures as well as construction practices to reduce the internal conflicts and have a productive work output. A glorious organisation, the BRO can climb to dizzy heights of high achievement based on a thorough introspection and a candid self-appraisal.

The views expressed by the author are personal and do not carry any official endorsement.

Notes

1. Pradip Sagar, "Ministry of Defence to Rope in Private Players for Border Roads," http://www.dnaindia.com/india/report-dna-exclusive-ministry-of-defence-to-rope-in-private-players-for-border-roads-1884504. Last accessed on January 10, 2014.
2. Ibid.
3. Mrinalsuman, "Pride of the Nation: Border Roads is a Dynamic Organisation in Distress," http:// www.forceindia.net /pride-of-the-nation.aspx.Last accessed on December 15,2013.
4. http://www.bro.nic.in/index1.asp?linkid=94&lang=1
5. http://www.bro.nic.in/index2.asp?sublinkid=294
6. A segregator plant is an combination equipment having a capacity of 50 tonnes per hour and is used for segregation of natural aggregates into a minimum of four different sizes.
7. http://www.cag.gov.in/html/reports/defence/2010-11_12DS/chap5.pdf. p. 40.
8. Ibid.
9. http://timesofindia.indiatimes.com/india/Lt-Col-gets-jail-for-financial-irregularities/articleshow/33460349.cms
10. Ajai Shukla, "Indian Tank Brigades to Defend China Border," *Business Standard*, September 17, 2012. Last accessed on September 16, 2014.