THE CHALLENGES OF FIBRE OPTIC INSTALLATION IN DEVELOPING MARKETS

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Abstract: *The demand for greater connectivity with emerging markets presents significant commercial opportunities for those involved in delivering new technology. Counterbalancing this, however, is a variety of operational challenges. Subsea fibre optic cables are becoming the primary method for telecommunications for such countries nonetheless, as markets they are often characterised by limited infrastructure, a different business culture and in some cases serious hazards both natural and manmade.*

So what exactly are the pitfalls and how do you manage these challenges to ensure the successful delivery of the project? This paper identifies the common factors and outlines a proven plan of action.

1. INTRODUCTION

When planning a fibre optic cable installation project many things need to be considered. Some of the challenges faced are obvious, some however are not, and some may even be hidden within the outlined in-country requirements. This paper assesses the key issues that are faced by an installer, it shares some examples from recent projects and highlights what needs to be factored in at the planning stage in order to minimise risk and maximise the opportunity regardless of system location.

2. COMMUNICATION

In our general business dealings we take it for granted that we will be able to speak to a contact, or at least leave a voice message, at any time of the day. In sharp contrast, in new markets the lack of good, modern communications is often a significant obstacle which needs to be addressed at the outset of a project. After all, better communication is the main reason for the fibre optic installation in the first place! A recent project undertaken by Global Marine provides a good illustration of this fact.

This particular island was served by three mobile telecommunications companies, each providing varying levels of signal strength over the land mass. In effect the island had three separate communication zones served respectively by three individual companies. So, for island-wide coverage, three SIM cards were needed which could be exchanged in the mobile phones to provide the project team with the continuous communication required during the project implementation phase.

International communications can also be difficult as the internet connection in this instance was less than 1,000 Kb/s and often as low as 250Kb. Indeed, it was so slow, the hotel wi-fi could not even support web browsing beyond very basic pages. As a result, the only form of outside communications was via Skype

text chat as the video was too bandwidth hungry. This lack of capacity is particularly relevant when gathering data for surveys and also when fine-tuning shore end landings. Satellite phones are a possible solution of course, but this is not cheap technology and it all adds to the overall project cost.

The challenges here can often be overlooked as in today's society we are used to communication being seamless and accessible regardless of time or location. It is essential that various channels of communication are agreed and put in place ahead of a project to ensure continuous operations on site.

3. LOGISTICS

Supply chain logistics in new markets are often fragmented and inconsistent. One of the most extreme examples of this was a project Global Marine undertook in the Arctic Circle. During the planning phase of the project, it became apparent that the mainland only received shipments once a week and deliveries to the remote landing site were made just once every month. This meant that deliveries of equipment to the mainland and then to the project landing site could not be made in time for the second shore end landing on the original plan.

On this basis two sets of cable landing equipment needed to be sourced so the project schedules could be maintained. An additional complication was the fact that the only means by which personnel could reach the remote landing site was by air. There were only two flights per week and these were only operational if the runway was open, which was a considerable concern with the amount of snowfall in the region! This meant that arrangements had to be made for the shore end team to stay longer than necessary at the project site to accommodate these restrictions and as such a negative effect was felt on the finances. This is why it is vital to understand the logistical constraints as early as possible within the planning process.

Poor transport links also require consideration to be given to the level of spares that need to be held in case of equipment failure. If the remoteness of the location means a replacement part cannot be delivered quickly enough to avoid unnecessary downtime then a decision needs to be made during the planning phase on how many spares need to be taken and held at the work site for each piece of equipment. The balance between additional costs for spares which are potentially not required and the impact of project downtime is one which needs careful consideration to define the correct balance.

The logistical challenges clearly differ location to location and in some cases as outlined above can be considerable and require significant time and effort to resolve. Nonetheless, as the network of subsea cables grows, and extends, more frequently to new previously unconnected territories these challenges will grow and the need for the installer to adapt becomes ever greater.

4. PERMITS AND REGIONAL VARIATION

As cables often cross through waters of multiple countries, different governments and authorities will be involved. Principle permits are those that the customer will need to obtain for the cable to be installed and remain on the seabed for the operational lifetime of the subsea fibre optic system. These can include environmental studies, easements or

seabed leases and any specific legislative requirements for the cable to be installed by respective governments. The red tape in some circumstances can be very long!

In many cases, customers, national and local authorities in new markets have never had to deal with a cable landing before. As a result they are uncertain about their responsibilities and have limited knowledge of any relevant international legislation in this regard. This can mean the learning curve is long and the permitting process can become protracted. As with the other challenges, however, being aware of this learning curve is key to preventing it compromising the outcome and is imperative to ensure the project timelines remaining on track.

Vessel clearance is another factor. Many authorities are used to dealing with vessels that enter their territorial waters, conduct the clearances at anchor prior to offloading merchandise or conducting operations solely within the countries territorial waters and then return to the same anchorage for clearing out formalities. However, this standard clearing out process can be difficult to conduct while installing fibre optic cable between countries, each with different rules and regulations. The vessel can easily become constricted in her ability to freely move to the known locations for vessel clearances unless the subsea fibre optic cable is cut at the location of the countries permitting limits.

To avoid these unnecessary cable cuts and associated jointing operations, it is important for the authorities to be aware of any potential restrictions as early as possible in the planning process so that pre-emptive action can be taken to avoid delays and additional project costs.

National protocols for fibre optic cable laying are fairly well documented but there can often be hidden trip wires at local level. A typical example might be when government approval has been given for the delivery of shore end landing equipment but further documentation is also required for the equipment to cross a number of local authority zones. If this is addressed during planning these local regulations can be researched so that the additional paperwork is in place to avoid in transit delays.

This section of the paper clearly identifies the need for pre-installation planning, as well as the importance of understanding the protocols of all the countries where the cable system route is planned.

5. SAFETY AND SECURITY

. In many European countries similar health and safety regulations are applied nationally but it's not the same across the world. Invariably, countries apply local practices and the project team must work to understand these and assess how the variations work in accordance with their own company's health and safety working guidelines.

Some of the countries that are yet to be connected by submarine fibre optic cables also face political challenges. This can potentially lead to a variety of security issues, which need careful assessment prior to deployment of personnel. Prior to any works being conducted with a country designated as requiring special consideration, a full security plan must be formulated which identifies the dangers and the level of security required to mitigate the risk as much as is reasonably practical.

During operations, the team should also consider carrying a satellite phone with GPS tracker at all times so that their movements can be monitored in real time by the project team in head office. Global Marine also advocates that their in-country personnel should attend a one-day specialist HEAT (hostile environment awareness training) course. Appropriate security arrangements will also need to be taken to ensure survey personnel and shore end teams are able to work safely.

Maritime economic opportunities in several areas of the world are increasingly being threatened by piracy. The problem is monitored both by the International Maritime Organisation (IMO) and the International Maritime Bureau (IMB) which acts as a focal point in the fight against all maritime crime. Sadly, the IMO reports that piracy and armed attacks against shipping are increasing at an unprecedented rate.

Of course, such a threat needs to be included in the security plan to ensure the vessel and personnel have maximum protection against the risk but another consideration is the impact these threats have on the cost of insurance. While piracy is not a new insured risk, the increase in the frequency of attacks has seen a sharp risk in the cost of premiums. In some regions vessels are even required to purchase war risk insurance cover.

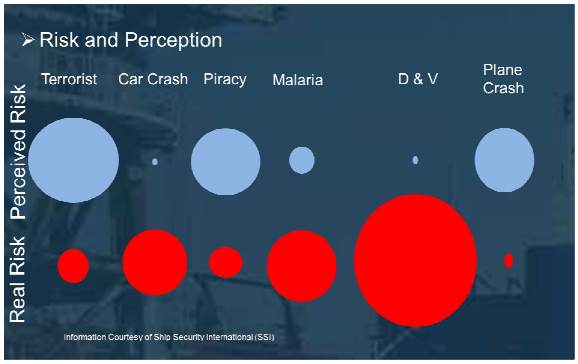

Figure 1 graph outlining actual vs. perceived risk of security issues provided by Ship Security International[1]

When a fibre optic system is to be installed in a new area of the world, risk profiles can be formulated based on perceptions of the area of operations. It is very important to spend time assessing the legitimacy of these observations and to collate risk profiles based on evidence rather than supposition. The above graphic compares perceived risk and real risk with regards to terrorism, travel accidents, piracy and medical issues. It can be seen from this graphic that the items people generally perceive as the major risks on a project are in many instances the risks that are less likely to have an impact on the project implementation. All risks need to have a mitigation plan but as seen in figure 1, it is often items such as car travel and disease which are the highest risk to failure rather than the items such as terrorism or piracy which are regularly the first items discussed during the risk log collation meetings.

Minimising financial risk is another important consideration. In countries where this type of project has rarely been seen, if at all, the local business community will often ask for increased values of expected expenditure to be paid in advance. Whilst a small payment up front is common practise in the industry, the unknown nature of the works and first time experiences of the cable installers can lead to the value of advanced payments increasing.

The cable installer therefore needs to be mindful of the impact this can have on cash flow as more cash will be leaving the

[1] Actual vs. perceived risk of security issues, Ship Security International 2015

business at an earlier stage than would normally be anticipated.

Safety and security challenges as outlined within this paper commonly are overstated as the perceived risk is in actual fact greater than the actual risk, the management of this and clear communication with all personnel is vital to ensure perspective is maintained by all involved in the project.

6. CONCLUSION

Having considered the caveats, now let's look at how these challenges can be managed. It's all down to proper planning and the gathering of all necessary intelligence at the start of the process.

For Global Marine, a desk top study (DTS) is a key part of the initial planning phase of any submarine cable system. Properly executed, a DTS should detail all the influences on the cable route and operational safety while providing sound engineering solutions for the environment encountered.

The DTS provides a technical reference for the entire project and throughout the life of the cable system, detailing factors likely to have a bearing on all subsequent activities, from survey through to installation and then throughout the system's operational and maintenance lifecycles.

This paper has touched on many of these factors already but here is a quick résumé of the main elements that need to be considered when embarking on a project within developing markets.

The concept phase should first identify areas that will create difficulties for the initial project survey, the installation process and subsequent maintenance. It will include any research and details gathered on environmental and cultural factors that are likely to compromise operations. The plan will also highlight relevant statutes and regulations imposed by the various authoritative bodies and factor in how different ways of working may impact cash flow.

The next step is to examine possible sources of risk to the cable, resources, assets and personnel associated with the delivery of the cable system and determine which permits, licences and other regulatory requirements that are necessary; both to install the cable and for the cable to remain in situ along the proposed route.

All these considerations may seem daunting and time consuming but the hurdles can be overcome. Meticulous methodology is the key to a smooth and successful cable laying project wherever it is in the world.