IMPLO®

# DEADENDS MAKE A DIFFERENCE:
# By the Numbers

## INTRODUCTION

IMPLO® deadends will save time and money on any transmission stringing operation. The way in which IMPLO deadends achieve startling results can be found in numerous write-ups. Here we will take a look at one specific project with actual numbers.

The project investigated in this study was a new installation of a two-circuit line – one double-bundle 345kV, the other a single conductor 115kV. Both circuits are installed on the same tower structure, and were with the same conductor size, 1192.5 Bunting ACSR. The line crews performing the deadend work under review were equally skilled in traditional compression and IMPLO, though IMPLO was a newer technology for them.

The following case studies were performed on two aspects of deadend work for this line. The first is the case of complete installation of nine deadends total on the hard side of the tower structure, performed on the structure with lines under tension. The second case is of deadends installed on the soft side, ground level with no tension on the lines. In neither case did the crews realize that time to complete was being taken.

## CASE STUDY: Hard-side installation

The crew installed the nine hard-sided deadends working out of a bucket on a structure as high as 110 feet. The topography around the structure was flat, and the right of way allowed for relatively easy access to all points on the structure. Had the terrain been more challenging not allowing for truck access, the differences in the installation times that appear in Table 1 would be all the more dramatic.

Fig.1 Hard-side installation

Both installations, whether with IMPLO or traditional compression, were performed with the same crews and equipment. Therefore, the main difference between the two hard-side installations was the time to completion. Cost rates are subjective to regional differences and equipment types on projects. However, the rates used for this analysis are quite conservative and serve to demonstrate the substantial difference in costs associated with each deadend technology.

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Table 1 – Hard-side Costs

| Deadend Installation Comparison | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Technology** | **Quantity** | **Installation Time** | **Crew** | **Equipment** | **Cost Rate (per hr/asset)** | **Total Cost** | **Savings** |
| IMPLO® | 9 | **3 hr 10 min** | 5 | platform truck | $60 | $1139 | $2461 |
| Traditional | 9 | **10 hr** | 5 | | $60 | $3600 | - |

The hard-side of the structure was completed in 1/3 the time and at a substantial cost savings using IMPLO deadends versus traditional compression. A quick look at this installation type shows a *savings of nearly seven hours* of installation time when using IMPLO. Actual costs will vary depending on access to the site, equipment required, and crew needed, but the controlling parameter of time clearly shows the IMPLO advantage. The faster time to complete the deadending of this structure allows the crew to move on to additional project work, which has substantial time and cost ramifications.

## CASE STUDY: Soft-side installation

The soft-side installation evaluation was performed in an area where once again ready access to the tower structure was possible by crew and equipment. The run was relatively short, only passing through one structure between the two deadend structures. The soft side deadends were installed at ground level with no tension on the conductors. Each phase of the short run was pulled separately, thus either one (on the115kV line) or two (on the 345kV line) deadends were installed and placed in final suspension at each stage. Figure 2 shows a typical set-up of two deadends that were installed at ground level before being raised to the tower and hooked to the insulator string.

Fig. 2 Soft-side installation

Once again, even where equipment is readily accessible to the deadends, the IMPLO installation was much faster than traditional compression.

Table 2 – Soft-side Costs

| Deadend Installation Comparison | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Technology** | **Quantity** | **Installation Time** | **Crew** | **Equipment** | **Cost Rate (per hr/asset)** | **Total Cost** | **Savings** |
| IMPLO® | 2 | 11 min | 9 | puller tensioner | $60 | $121 | $207 |
| | 1 | 7 mins | | | | $77 | $110 |
| | | | | | | Total: | $317 |
| Traditional | 2 | 30 mins | 9 | | $60 | $330 | - |
| | 1 | 17 mins | | | | $187 | - |

Once again the IMPLO deadends install much faster, and result in an overall savings for the soft-side installation. Calculated for the entire soft-side of this structure, IMPLO deadends resulted in a total savings of nearly 1 hr and 30 minutes. That represents a savings of roughly 61% in installation time and resulting cost versus the same job done with traditional compression!

## CASE STUDY: Project extrapolation

The installation savings of IMPLO deadends versus traditional compression are impressive in the specific examples of hard and soft-side installations. However, even more meaningful and impressive is when these numbers are extrapolated out across an entire project.

Having shorter installation times can be extremely significant given the many factors that contribute to project duration. During the stringing operation, as aforementioned, topography plays a role in the time to install. Also of consideration is how weather will affect the installation over the weeks and months of a typical project. Faster install times using IMPLO can take advantage of partial days where traditional compression installations would be suspended. Not including such events, extrapolating the above scenarios over a complete job results in dramatic project time savings. Table 3 provides a breakdown of how IMPLO results in overall project time savings that far exceed what can be achieved via tradition compression means.

Table 3 Extrapolated Time Savings

| Deadend Installation Comparison | | | | | |
|---|---|---|---|---|---|
| Technology | Deadend Structures | Hard-side Installation (hrs) | Soft-side Installation (hrs) | Total Time (hrs) | Project Time Savings (Based on 10 hr days) |
| IMPLO® | 50 | 3.2 | 2.5 | 285 | **41.5 days** |
| Traditional | 50 | 10 | 4 | 700 | |

Note: Installation times are complete installation times from initiation to final hook-up. This extrapolation assumes an equal number of hard and soft-side structures.

The total cost to any transmission line installation is very dependent on when the overall project completes. The utilization of IMPLO can have a dramatic result in making up lost time or exceeding initial estimates when compared to where traditional compression would have been utilized. IMPLO deadends are not only cost effective, but are a necessity in times where highly visible transmission projects must come to completion on time.

## SUMMARY

Although different crews will perform the same job in numerous ways to achieve the end result, the dramatic savings utilizing IMPLO versus traditional compression are real and can be expected on each and every transmission job.

The examples used in this study are relatively conservative given the terrain and access to the job sites by equipment and crews. In each case IMPLO deadends were installed in approximately 1/3 the time it took traditional compression deadends. More severe topography, restricted land access, environmental concerns and weather events can and will affect the time to perform an installation, and in all cases, IMPLO will reduce the impact of these variables and minimize project time to completion.

It must be understood that when using IMPLO deadends, a time study comparison between a compression deadend to IMPLO deadend is *not* one-to-one. IMPLO technology does not only reduce the immediate deadend install time, but instead, changes the entire work flow. The efficiency gains from IMPLO technology are due to substantial productivity increases which lead to the incomparable time and project cost savings as witnessed in this case study.