TRANSPORT FOR ALL TERRAINS

Erica LoPresti, on behalf of Terramac, USA, explores how rubber track crawler carriers can be used for a variety of tasks during operations.

The very nature of pipeline construction demands versatility, ease of operation, and reliability from the equipment that is being used. A pipeline right-of-way (ROW) extends across various types of terrain, causing ground pressure and traction to be major concerns throughout the process. The rubber track crawler carrier is engineered to tackle the various tasks of a pipeline project.

Standard wheeled trucks and steel track carriers have traditionally been the preferred solution for most material transport applications, but pipeline contractors found that productivity suffered when these heavy haulers became stuck in wet ground conditions. In addition, the footprint of these machines often caused enough soil damage in transit to require remedial repair work, resulting in project cost overruns.

Figure 1. The Terramac RT9 crawler carrier with two tac welding units working on a 10 in. and 12 in. pipeline.

"Rubber track crawler carriers are designed for the type of terrain chassis trucks and other vehicles can't handle due to ground conditions, steep grade or working angles," says Mike Crimaldi, CEO of Terramac, a manufacturer of rubber track crawler carriers. "One important benefit of the rubber tracks is that the vehicle exerts minimum ground pressure at full capacity. This leaves a minimal footprint for less soil disturbance and provides reduced slippage for the toughest weather and terrain conditions. In addition, with the ability to manoeuvre in all types of terrain, crawler carriers can easily haul material when necessary on asphalt access roads without damaging the surface."

"The multi-purpose carrier is built with a frame that easily accommodates customisations," adds Crimaldi. "It can support various types of specialised pipeline equipment for the job at hand. Anything seen on the back of a truck can be outfitted onto a carrier."

"The capabilities of the crawler carrier are unlimited," says Chris Holomon, Purchasing and Procurement Professional at Enviro Services. "These machines are so versatile that they can be used from start to finish on a pipeline project. Interchangeability between attachments is a main drawing point for utilising crawler carriers on pipeline projects. In the beginning phases, crawler carriers can haul and transport material or personnel down the ROW. They can be used for various tasks, such as welding and sandblasting during the middle phases, as well as during the final phase for reclamation."

The result is the ability to take workers, equipment, and raw materials to any job location to complete the pipeline on time and on budget. These tasks include the following:

Figure 2. Rotating functionality enables the Terramac RT14R to haul and dump materials in confined spaces.

Figure 3. Configured with a personnel carrier, Terramac units transport crews to remote pipeline jobsites.

Clearing and potholing

The pipeline ROW is cleared of vegetation in order to establish a path for the pipeline, as well as for the transport of equipment and material during the construction process.

"Crawler carriers are used to remove the brush and mulch from the ROW, which is often repurposed during the reclamation process," says Jesse Whittaker, Director of Business Development at Terramac.

Potholing to identify existing utility lines before trenching and laying pipe is also a critical early step. This process has been improved with the use of vacuum excavators, also known as pothole rigs, mounted onto rubber track crawler carriers.

"The crawler carriers equipped with pothole rigs provide contractors a safer, faster, and more cost-efficient exposure of the pipelines," says Holomon. "Crawler carriers are widely used for this application for their nimble movement on all terrain types, unlike wheeled semi-trucks that were previously used."

Hauling and transport

Flatbed crawler carriers lead the way on pipeline jobsites by hauling mats in preparation for heavier equipment to come through, while dump bed carriers haul out debris and bring in rock, sand bags and other materials. "More than 35 years ago we used to haul material along the ROW with sleds pulled by dozers. Sometimes two pieces of heavy equipment needed to be used," explains DJ Craven, Vice President of Pipeline Systems Inc. "Crawler carriers allow us to combine these tasks but at a lesser cost, because they can be operated by one trained crew member. This results in our crews being much more self-sufficient."

"We need to be able to transport material in between the access points along the ROW," says Craven. "There can be thousands of feet between each point, and the terrain can be extremely hilly or muddy. Because of their lighter footprint, the crawler carriers are able to effortlessly transport sand bags and dirt to the remote areas in which the crews are located, regardless of ground conditions."

Breakthroughs in conquering various terrain types have led to other developments for crawler carriers. "We developed the Terramac RT14R unit that features a 360° rotating upper frame," says Crimaldi. "The unit's unique rotational functionality allows materials to be offloaded faster and the driver can head right back out. This solution has dramatically saved time by eliminating the need for the driver to navigate the truck into a dumping position through a series of start and stop manoeuvres. Instead, a simple touch of the switch rotates the bed into the desired position to deliver the material to the exact location, without any adjustment of track positioning."

Contractors are provided with a solution to tackle a range of applications while improving efficiency and saving costs. The amount of time saved adds up quickly when the number of loads being hauled on a daily basis is factored in.

An additional application for rotating crawler carriers is evident when padding the pipeline; sand bags, cribbing or other material can be dumped directly into the trench, rather than left on the side. Also, mat hauling on steep inclines with a rotating unit provides less wear on the undercarriage and increases the life of the machine.

Personnel transport

Personnel carriers make the transport of crew members to and from a jobsite a safe, easy, and efficient task. Personnel carriers are utilised throughout the entire pipeline project – from the clearing crews to the final reclamation crews – for their ability to transport the maximum number of workers with one vehicle while minimising trips over rough, soft, and steep ground conditions.

"One personnel carrier can take up to 25 crew members plus all of their tools and meals safely out to the jobsite and back," says Whittaker. "No need for multiple vehicles that get in the way or get stuck trying to get through. The cabins can also be enclosed and equipped with heaters to protect crews from the worksite elements, which makes a big difference."

Pipeline stringing

Transporting pipe along the ROW requires the utmost strength and attention to detail. Crawler carriers equipped with a specialised fifth wheel attachment simplify the pipeline stringing process by pulling the stringing trailer. These specialised carrier units allow the stringing crew to efficiently string the pipe from end-to-end along the ROW, eliminating the need for using heavy haulers that cause soil damage or become stuck in adverse ground conditions while in transit. Flatbed carriers can also be utilised during this process to haul pipe to the jobsite.

In addition, crawler carriers with fuel tanks provide fuel for the entire fleet of equipment while working along the ROW; this increases productivity as machinery does not need to travel from the remote jobsite to a main road or equipment yard for refuelling.

Pipe welding and coating

Crawler carriers are often used as all-terrain welding systems. After the stringing and bending are complete, the pipe sections are aligned to be welded together in preparation for placement into the trench.

Figure 4. Crawler carriers tackle environmentally sensitive jobs with a variety of restoration equipment, including hydroseeding units.

"There is no easy way to get the welding trucks with rigs out to certain areas, especially when working in the hills of West Virginia, Pennsylvania, and parts of Ohio," says Craven. "The hills are not the terrain for a pick-up or heavy-duty truck. However, with the low ground pressure and off-road capability of a rubber track carrier, our crews are able to tackle the challenging ground conditions, reach the worksite while carrying the welding system, and finish the job."

Crawler carriers can also be configured with a crane to help the welding crew pick up and hold a line clamp whilst tac welding the pipe into place. The crane is also useful for holding up a canopy to provide the crew with shade during the welding process, which is important for keeping sun glare out of their welding hoods.

"The Terramac RT9 with tac welder unit has become highly useful on our customers' pipeline jobsites," says Whittaker. "It's able to deliver power for up to four welders at one time while also providing the shaded canopy necessary for teams to perfect their welds."

In addition, crawler carriers can be equipped with sandblasting rigs, air compressors, and sandblast pots to make cleaning and coating a simple process for maintaining a pipeline over time. These specialised carrier units allow crews to sandblast the welds and remove any of the initial coating that could have been damaged during the welding process.

Reclamation

Restoring land to its original state is the last part of a job, and reaching jobsites in need of environmental reclamation has a reputation for being problematic. However, this important step can be made easier with rubber track crawler carriers equipped with specialised restoration equipment, such as hydroseeding units.

"After the pipeline construction is complete, we use the Terramac RT14 to haul and replace the topsoil along the ROW and then follow up with the RT14 equipped with a hydroseeding unit to seed, fertilize and mulch the land in one simple process," says Roger Zacher, Co-Owner at Absolute Reclamation Services.

Crawler carriers with water tanks can be used to supply the hydroseeding crew with a steady supply of water to increase production. Other restoration attachment options include bark blowers and straw blowers.

Crawler carriers are also utilised for the installation, maintenance and removal of erosion and sedimentation (E&S) control devices along the ROW.

"Due to the flotation from the rubber tracks, we are able to safely maintain the E&S devices with minimal environmental damage and disturbance to the soil. Once we achieve 70% growth on the ROW, we are able to go back in and remove all of the E&S devices," says Zacher. "At this stage, land owners may also want the wood chips removed from their fields and pastures located along the ROW. We utilise the crawler carrier to haul all of that material back out so the crews finish the job with little evidence they were ever there working."