Properly Securing Hoses to Manlifts and Scaffold

By Ray Schallom III

Decades ago, a seasoned carpenter showed me how to tie 2x4s and reinforcing bar together so I could lower it down a shaft without losing the load. Prior to my lesson, I lost a load down the shaft. Fortunately for me, no one was underneath the falling material.

When I got the opportunity to learn how to shotcrete a couple of years later (back then it was called gunite), it was always difficult securing the hoses in the manlift, swing stages, and scaffolding without the ropes loosening. Anyone who has ever experienced this knows that it is tough shooting properly while fighting to keep the hose in the basket, whether on a manlift, swing stage, or a scaffold platform.

Fig. 1: Slipknot is the first knot wrapped around the shotcrete hoses

SLIPKNOTS AND OVERHAND KNOTS

When I learned how to apply shotcrete several decades ago, it took me several attempts to perfect the combination of knots that prevented my hoses from kinking, sliding off the scaffold planks, or move when the wet-mix hose surged between strokes. I used to call the knot configuration the "labor" knot only to find out the official names of each knot years later. You first start out with a slipknot around the hose as shown in Fig. 1, then you add two overhand knots as shown in Fig. 2. Next, you wrap the rope tight around the rail pipe of the manlift, scaffold, or swing stage so that the weight of the hose is suspended by the rope.

Figures 3 through 6 show the hoses tied off to the boom, manlift basket, and work platform in different environments. In all cases, the knots used are the knots shown in Fig. 1 and 2. As OSHA's safety requirements increase every year in all construction work, what remains compliant is the combination slipknot with overhand knots together to secure hoses or loads.

With the vibration of the dry-mix hose or the surging of the wet-mix hose between strokes of the pump, the knots tighten to prevent slippage. Using 5/8 or 3/4 in. (16 or 19 mm) nylon rope works the best in all weather conditions. The rope needs to be taped at the end before cutting to the desired length. This will prevent the rope from unraveling.

I have tried all kinds of knots to secure hoses over the years. The knot that has performed the best for me and other contractors that I consult for is the slip with two

Fig. 2: (a) Overhand knot; and (b) adding two overhand knots, also known as Marline Hitching, above the slipknot gives you a combination that is OSHA-compliant

overhand knots. It's very difficult for me to watch shotcrete crews and nozzlemen struggle with the dry-mix and wet-mix hoses when the hoses are not secured tight enough.

CONCLUSIONS

Try the knots out. Maybe make it a part of one of your toolbox talks. It may take the crew a few tries to perfect it but once they get the hang of tying these knots, I know it will save you time and money on the job every day. The extra security of attaching the hose will also make the nozzleman's job a little easier so they can concentrate on shotcrete placement. It's somewhat amazing that just knowing how to tie a few simple knots can make your jobs safer, more productive, and allow your nozzlemen to concentrate on the shooting and not manhandling the hose.

Fig. 3: Wet-mix shotcrete hose secured to the boom and basket while shooting a concrete dome (Rain CII, Gramercy, LA)

Fig. 4: Dry-mix shotcrete and water hose secured to the manlift basket 60 ft (18 m) in the air (Buchannan Dam, Llano County, TX)

Fig. 5: Close-up of dry-mix shotcrete and water hose secured to the manlift while moving. The rope keeps the hose from pulling out of the basket (Buchanan Dam, Llano County, TX)

Fig. 6: Wet-mix shotcrete and accelerator hose secured to the work platform (GAB Pedestrian Tunnel, Richmond, VA)

Fig. 7: Wet-mix shotcrete and air hoses secured to the manlift basket (Shotcrete Technology Transfer Expo, Santiago, Chili)

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