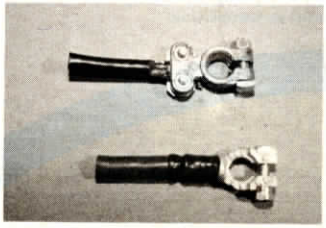
## "10 TIMES MORE CONDUCTIVE

# New Copper Terminals Boost Battery Performance

"They have 10 times more conductivity than commonly-used lead terminals, the leading cause of battery failure," says Bill Bishop, sales manager for Southern Fastener Co., manufacturer of new "crimp type" copper connecting terminals for car, truck and tractor batteries.

Bishop feels many farmers mistakenly blame battery failure on the battery itself when the problem is with the connecting cables. "Most batteries are hooked up using conventional copper cables with bolt-on terminals made of lead affixed to each end. "Lead has a conductivity of only 8 to 10%, compared to 97% for copper. The disadvantage of this lead-to-copper hookup is obvious. Low-conductive lead terminals not only restrict cranking power from the battery to the starter, but also severely restrict the flow of charging amps from the alternator to the battery," explains Bishop.

He points out that solder-type battery terminals are constructed of brass with a conductivity rate of 65 to 70%. "These terminals have a distinct advantage in conductivity over lead. However, most solder-type terminals are soldered with a 60/40 lead-tin solder. Surrounding 97% conductible copper with 8 to 10% conductible lead solder is, once again, creating a tremendous amount of resistance in the system."



**Old style cable (top) and new "crimp type" connecting terminal.**

To get batteries hooked up with virtually no loss in conductivity, Southern Fastener Co. has introduced crimp-type connecting terminals, constructed of copper with a corrosion resistant plating, for making your own highly-efficient battery cables.

"We think our new copper terminals are, by far, the best choice available for hooking up batteries. The connections are copper to copper so there are no dissimilar metals involved to cause resistance or to create corrosion. We've developed a special crimping tool for affixing our new copper terminals to copper cable. We also have developed an exclusive teflon coated heat-shrink sleeve which seals cables and connectors against battery gas, moisture, oil or anything else that can cause corrosion and reduced battery performance."

In making your own battery cables with the new copper terminals and protective teflon sleeves, Southern recommends that you also use welding cable (size 2/0 for big tractors and combines and No.l for smaller tractors, pickups and cars) instead of conventional battery cable.

"Welding cable has a much better insulation and will carry half again as many amps as the same size battery cable. For example, a system constructed of 2/0 welding cable and our new copper terminals will carry more than 650 amps on a cranking surge. A similar system using 2/0 battery cable will carry only 250 amps. The difference is obvious. What's more, welding cable is more flexible, adding to the ease of making multi-batteryhookups," Bishop explains.

You can purchase individual positive and negative terminals for right at $4 each for 2/0 welding cable, and $3 each to fit No. 1 cable. The special crimping tool you'll need sells for $29.95.

Or, you can buy do-it-yourself kits made up of terminals for 2/0 cable, for No.1 cable, or for both. For example, a BAT-6 kit includes the following pieces: six positive and six negative terminals for 2/0 cable and the same for No. 1 cable; three positive and three negative flag terminals (for multiple battery hookups) for 2/0 cable; 12 starter lugs for 2/0 (both 3/8 and 1/2-in. stud) and six for No. 1 cable; 2 ft. of heat shrink teflon tubing; a crimping tool; a steel box to hold all the pieces; and one can of battery cleaner/protector spray. The BAT-6 kit sells for $235.62.

Contact: FARM SHOW Followup, Southern Fastener Co. 4845 Homestead, Suite 520, Houston, Texas 77028 (ph 800-847-5685; In Texas, call 713 676-2726).

Bonnie Heidtke photo courtesy The Land magazine.

**Concrete pillars and 7/8-in. dia. steel cable support the 123-ft. long bridge.**

## "BRIDGE OVER THE RIVER ZUMBRO"

# Build Yourself A Bridge

If you're in need of a low cost bridge to get machinery or people across a river or wide creek, this home made "Bridge Over The River Zumbro" might be just the ticket.

It was designed and built as a family project by John and Dorothy Zemke and their children David, Joy and Daniel. The Zemkes own land on both sides of the Zumbro river near Pine Island in southeastern Minnesota. Getting from one side to the other the long way around meant traveling 1.5 miles. Their suspension bridge shortened that distance to 123 ft.

The Zemkes plan to develop a campground on their wooded land located across the river from their farm headquarters. Their primary purpose in building the bridge was to create a handy passageway for persons to walk back and forth, and for light equipment, such as ATV's, snowmobiles and garden tractors. "The bridge is 6 ft. wide and will easily support ten people weighing 200 lbs. each," says John who regularly crosses it with a "3 wheeler" and trailer loaded with upwards of 800 lbs. of chainsaws and other equipment. "By beefing up the wood floor and making it wider, you could easily adapt this basic design to build yourself a suspension bridge wide enough and strong enough to support machinery, cars, trucks, and other equipment."

The bridge-building project began in the spring of '87 with family members and friends supplying technical know-how and labor.

David, an engineering student, assisted in designing the bridge and drawing blueprints. The final draft was sent to the Department of Natural Resources (DNR) and, over a period of several months, made its way to the U.S. Army Corp of Engineers. Because 100 ft. on each side of the river is controlled by the DNR, final approval rested in their hands.

"We had to sign an affidavit holding us responsible for any damage done in the event the bridge would happen to turn into a dam and cause damage upstream," John told FARM SHOW. "We don't anticipate any problems. In an unusually high water emergency, it would only take us about 15 minutes lead time to loosen support cables so the wooden walkway would hang vertically and swing if hit by floating logs, ice chunks or whatever. If the high water hit before we could loosen cables, the bridge would still be high enough to withstand an unusually severe flood emergency."

The two giant pillars supporting the bridge are 123 ft. apart and stand 22 ft. above ground level. They're made in three sections. The bottom section, which extends about 5 ft. underground, is made of concrete culvert measuring 21 in. inside dia. Setting on top of it is a smaller concrete culvert measuring 12 in. inside dia. The top section is a 9 in. dia PVC pipe which extends down into the middle section. Vertical reinforcing rods and concrete, poured inside the culverts and around the rods, and inside the PVC pipe, strengthen each pillar. They're set on concrete footings measuring 8 ft. by 12 ft. by 1 ft. thick.

The two horizontal cables spanning the bridge are 7/8 in. in dia. and are anchored at each end by 10 ft. support posts made of 21 in. dia. concrete culverts buried 5 ft. in the ground and filled with concrete and rebar. The anchors are connected to concrete footings measuring 6 ft. by 12 ft. by 1 ft. thick. Vertical support cables are 3/8 in. in dia. and spaced 6 ft. apart.

To allow for seasonal contraction and expansion, the Zemkes installed car springs in the middle of the bridge. Treated planking for the floor (1-1/4 by 6 in. by 6 ft. long) carries a 40 year "no maintenance needed" warranty.

The final step to be completed this spring is to add side rails, made of 42 in. high chain link fence. It'll be supported horizontally along the top with a piece of 3/8 in. dia. cable, and secured to existing 3/8 in. vertical support cables.

John says his total out-of-pocket cost for materials was under $3,000. The "bargain price" concrete culverts were seconds and the 7/8 in. cable, salvaged from a crane, was purchased "dirt cheap." The single most expensive item was the treated, round cornered (to reduce slivering) patio lumber used to make the walkway.

For more information, contact: FARM SHOW Followup, John Zemke, Rt. 1, Box 719, Pine Island, Minn. 55963 (ph 507 356-8647).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*For everyone in agriculture interested in latest new product*

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