

INVESTIGATOR'S SUMMARY*

Nomination 2005-08

Investigator: Christine K. Miller[†]

WIRE CLIP-ON REINFORCING TIE

The Innovation

In January 2005 at the World of Concrete show in Las Vegas, Con-tie introduced the "Speed-Clip Rebar Tie." The Speed-Clip tie is a simple spring-loaded wire clip that allows rebar connections to be made quickly and easily without the use of tools. Speed-Clip left the World of Concrete show with the award for "most innovative product."

Using Speed-Clip ties provides a fast and secure method for tying rebar in various configurations including parallel, perpendicular intersections or other angles. The spring-loaded tension in the clip securely holds the bar cross-members together.

Tying rebar is a labor intensive, backbreaking, and repetitive construction activity. Traditional rebar tying is done by rodbusters pulling wire from a wire reel on their tool belt that is then cut to length and tied. It involves cutting, twisting, and a bent over stance in most cases. With the advent of Speed-Clip, workers are bent over for a lesser amount of time and have less wrist twisting and stress. This can help reduce the amount of repetitive stress injuries filed through Worker's Compensation claims.

Speed-Clip states that labor savings is the greatest benefit of their product. Tying time is generally cut in half and unskilled workers can easily be taught to tie wire in the space of minutes. Because unskilled workers are usually less costly than skilled, contractors are able to realize additional labor savings.

The Speed-Clip technology is currently awaiting a patent. It was developed in Danville, California through a series of prototypes and mock ups. The final design was completed in the summer of 2004, which led to field testing by a concrete contractor specializing in concrete patios and concrete driveways. This product is slowly gaining momentum and is being used in walls, precast concrete, tilt-up construction, retaining walls, pools, and more. The California Department of Transportation (CALTRANS) is currently testing the product in concrete repair work.

* This is a confidential engineering report produced by a CIF Investigator solely for consideration by the NOVA Awards Jury. Access is restricted to the NOVA Award Jury and CIF Officers, Investigators, and Staff for five years except with the expressed permission of the Construction Innovation Forum. September 1, 2005.

[†] Construction Manager, Grand View Construction, Jackson, Wyoming.

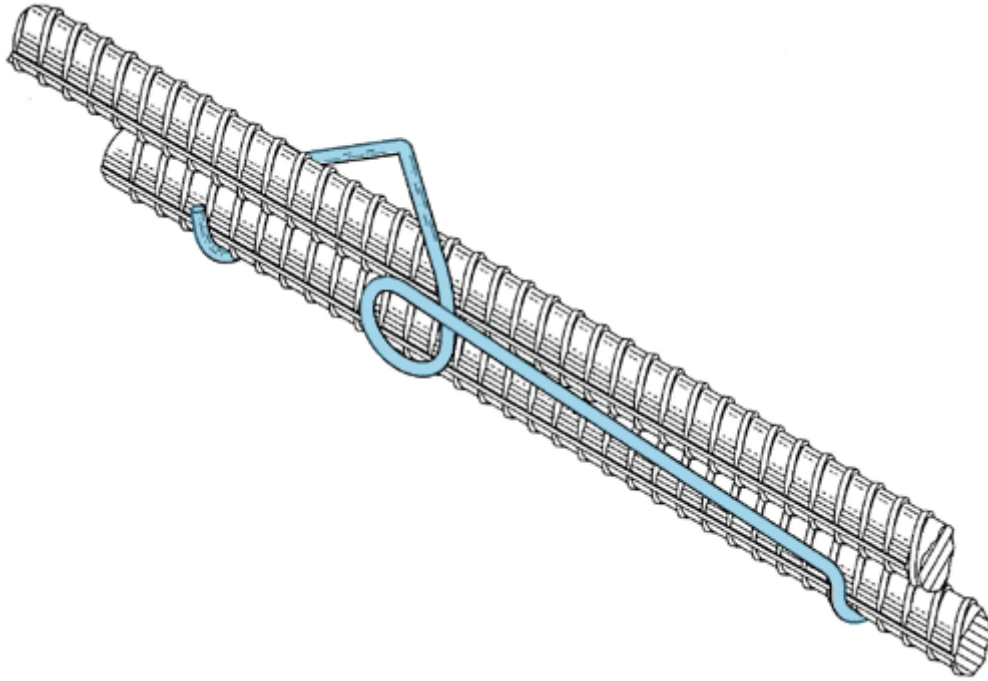


Figure 1. Speed-Clip Schematic for Parallel Connection.

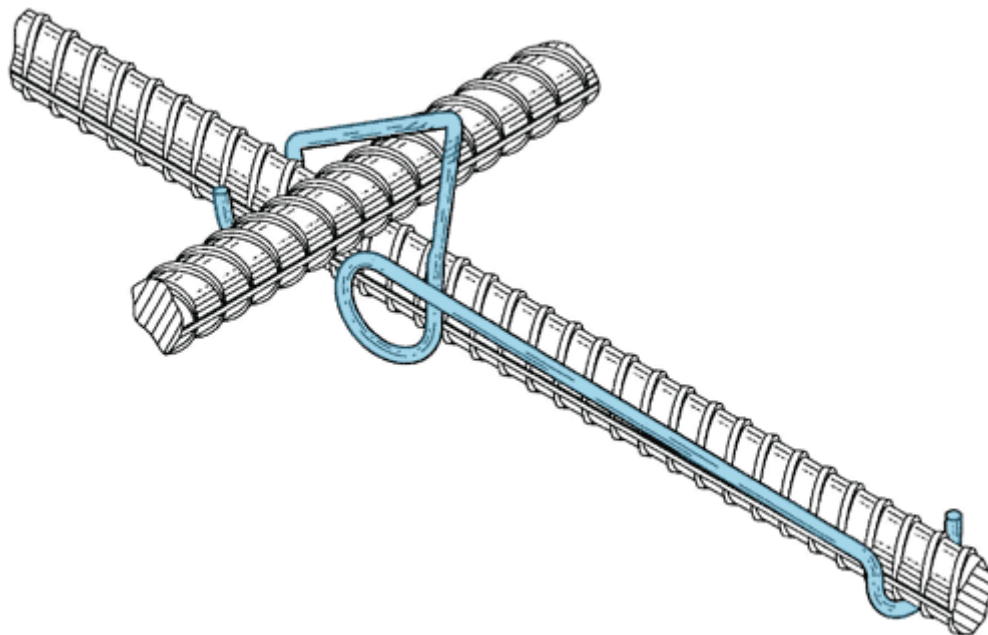


Figure 2. Speed-Clip Schematic for a Perpendicular Connection.

Application of the Innovation

Speed Clip sent a sample of their product. As we were preparing a fifteen foot concrete wall pour, our superintendent took the product out in the field for testing. As a brief background, our superintendent Dale Blackett has over 30 years in the construction field. He has owned his own concrete contracting firm and spent over eighteen years with Jacobsen Construction as a union rod buster, concrete foreman, and superintendent working on a number of high profile projects in Salt Lake City



Figure 3. An Application of an In-ground Concrete Pool Tied with Speed-Clips.

Dale had mixed reviews on the clips. At first he said it was difficult to figure out which end went where. After getting the hang of it, he said that using the clips for walls would not allow a worker to “safely” crawl on the rebar wall cage. While we know that climbing on rebar is not recommended, in the field it is a common practice and sometimes an act of necessity. Speed-Clip clearly states on their website that the connections with their ties should not be climbed on. This was a negative for Dale. While he admitted to being very “old school” in his approach to tying rebar, he did think that the product would work nicely in slab on grade applications.

Price is another key point in the application and acceptance of this product. While Speed-Clip is currently the most expensive of the three products that seem to be in direct competition, Tom indicated that his pricing is such because of the short run production used to date. He has decided to manufacture his product overseas in China and hopes to move the price point closer to \$0.10 per clip. According to the contractor I interviewed, the cost of the ties is offset by the money he saves in using unskilled labor with higher productivity rates than traditional wire tying from a reel.

Manufacturer	Price per Clip
Speed-Clip	\$ 0.17
Kodiklip	\$ 0.15
Con-clip	\$ 0.10

Answer to Key Points from the Jury

Do the three products (Speed-Tie, Kodiklip, and Clip-con) together warrant a Nova Award? Or do just one or two of them?

Please see a detailed description of Kodiklip and Clip-con in the section on competition. While these are parallel innovations, there are some distinguishing factors between the two. Speed-tie is better equipped to handle angles that are not exactly perpendicular or parallel ties. Speed-tie does not require a tool. Obviously, these products are competing in the same markets. With the relative newness of their introduction, it is difficult to determine where and if a significant market share will be captured by one product versus the other.

What do engineers, contractors, and workers think of the innovation?

I was not able to get feedback from engineers on this product. To my knowledge this product is not currently being specified by engineers on any project. CALTRAN is testing the product in road repair work they self-perform. Contractors seem to appreciate the labor savings in using unskilled workers and the increased productivity offered by this product. Jeff Debaradi, a contractor and worker said he has used the clips personally in the field and they are easy to use and fast to place.

Is the innovation generally accepted, or is there a geographic area or reinforced concrete specialty area that accepts it and uses it widely?

According to Tom McQueen, there has not been a geographical concentration in users. He has sold this product in Pennsylvania, Hawaii, California, and New York. Because he is actively seeking distributors for his product, Tom predicts that his product will capture a greater market share than his competition. United Rentals is pursuing a line of construction products similar to W.W. Grainger Supply and Whitecap Industries and would like to add Tom's product to their offerings. He does foresee resistance from the union markets.

Background of the Innovation

In the past couple years we have seen a number of improvements in the traditional process of rebar tying. First, automatic rebar tying machines automated rebar tying and now the newly introduced rebar clips again advance the technology of rebar tying. It seems these rebar clips were all developed in parallel and all introduced in the last twelve months.

Responsibility for the Innovation

Tom McQueen and Mark LeBlanc would be accepting the NOVA Award on behalf of Con-Tie. The original idea for the Speed-Clip came from Rod Dotson and Jack McCafferty about two years ago. These two gentlemen were primarily residential concrete contractors concentrating on driveways, landscape retaining walls, and patios. The majority of their workforce was unskilled and they wanted to come up with a tie that didn't require tools or training. So they started bending a wire to try to accomplish a tie without the use of a tool. They developed a crude mockup.

Tom stepped in and bought the rights to the idea and took it home to his garage where he spent hours refining the accuracy and placement of the bends, the tension in the spring, and connections. Then Tom took the final prototype and sent it out for a short run of production which he then tested in a 10,000 sf slab on grade pour in his driveway. Part of the driveway was tied with conventional tying techniques and the other part was tied using his new product. He found the part tied with Speed-Clip was very solid while the part tied with traditional techniques moved. Tom then approached a friend of his who is a contractor in Pleasanton, California (please see interview with Jeff Debanardi). They tested it in multiple concrete pours. Next Tom found a precast contractor in Northern California who specializes in utility vaults and septic tanks. This contractor tied his cages and used a forklift to move the cage into the concrete forms and experienced no deformation of the cage while being moved. Another testament to the solid connections accomplished with Speed-Clips.

Competing Products

During the initial jury meeting, two competing products were identified, namely, KodiKlip and Clip-Con Re-Bar Fasteners. Through extensive internet searches I was not able to identify additional competitors. I would remind the jury that the Maxx/U-Tier automatic tying hand tools (winner of a 2004 NOVA Award) would be a direct competitor as well. Therefore I will touch on their product briefly.

Kodi-Klip Rebar & Post-Tension Connectors

www.kodiklip.com



Figure 4. Kodiklip Application and Kodistik Being Pushed into Place with Kodistik Tool.

A division of J.Cubed International and manufactured in Lebanon, Tennessee, the Kodi-Klip was developed by Jon Kodi. Jon states that he made his first prototype for the Kodiklip from PVC pipe purchased at Lowe's. Refining it in his kitchen, Jon developed the Kodiklip and Kodistik. Kodiklips are easily pushed into place with the Kodistik, which costs about \$32.95 per stick. Kodiklip's web site states "we wanted a faster, easier, more user friendly method to connect rebar." The Klip was designed to eliminate the struggle of twisting, cutting, and getting cut up while doing your job. Bars are firmly held in place with a simple "place, push, and snap." They claim three Kodiklips can be placed in the time it takes to tie one wire with traditional tying techniques.

Clip-Con Re-Bar Fasteners – Injection Molded Plastic Re-Bar Clips

www.clip-con.com

Based in Cupertino, California, Clip-Con has an active website. Tom McQueen indicated that he did not think they were actively selling. There is a complete price list on their website.

They offer different colors for different size clips and also different clips for different connections, namely, parallel and perpendicular connections. Cross clips for perpendicular connections are installed using a hammer to tap the plastic tie in place. The extension clips for parallel connections do not require any tools.

Included on their site is an extensive list of clients including the New York Department of Transportation, Los Angeles County Water and Power District, and a number of construction contractors across the United States. They did introduce their product prior to Kodiklip.

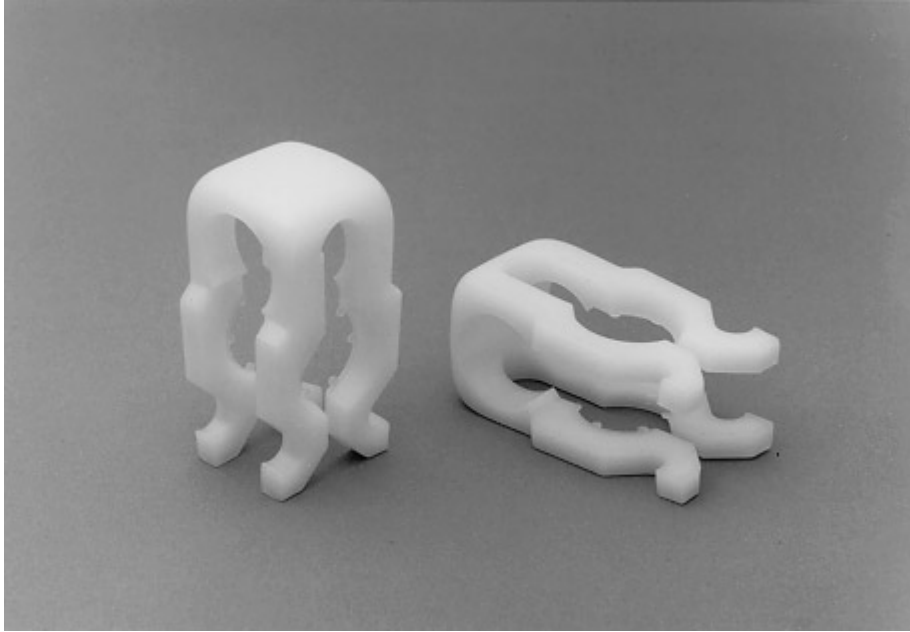


Figure 4. Sample Photo of Clip-con Product.

Their website includes the following summary results of independent testing performed by B.L. Gabrielson, Ph.D., a Professor of Civil Engineering at San Jose State University.

Comparative Test Results

- NO statistical difference between impacts on wire ties and on Clip-Con Clips was observed.
- NO measurable or visual effect was evident on Test specimen.
- NO spalling was observed.

Splice Clips Test Results

- NO measurable difference and NO spalling failure resulted.

Conclusions

- NO failures were encountered over the strength range 2,500 to 4,000 psi. With four impact loadings at each point, Test specimen I Type 14,000 psi showed some dusting around the edge of impact crater on less than 10% of the Clip-Con points, while 75% of the wire ties showed "crater dusting."
- NO difference in results with 6-inch or 9-inch Re-Bar spacing on either Test specimen. (Note: Test observations showed Re-Bar spacing with use of Clips down to 3 inches possible.)
- NO deleterious effect on impact resistance of concrete caused by the intrusion of Clips into 1/4 cover.



Figure 5. Example of Clip-con being installed with a hammer

Other Competitors –

Max Cordless Rebar Tier (www.maxusacorp.com)

U-Tier Automatic Rebar Tying Machine

(http://hitmax.com/specialtyproducts/specialty_product_utier.htm)

- Larger initial expense to acquire (approximately \$2000-\$3000 per tying machine)
- Batteries must be fully charged
- Tying machines must be properly stored and cleaned. Sand and grit can wreak havoc on the machines delicate parts.
- Previous NOVA Award winner. This was the first time that rebar wire tying had been automated. Innovative because it reduced repetitive strain on wrists and hands, increased productivity extensively, and was an economical alternative to traditional wire tying from a spool.
- For information on these products, please access the previous winners portion of the CIF website.

Opinions of Persons Contacted

Tom McQueen gave me contacts from a concrete contractor in Hawaii and a residential contractor in California. I was unable to contact the contractor in Hawaii due to the time zone differences. I did interview the residential contractor from California. Please see selected excerpts from this interview later in the report. In addition, a testimonial from Chet Voss of Voss Construction has been included.

Investigator's Comments

The future of Speed-Clip is promising. Tom McQueen is working to improve the market price and hopes you will see his product soon on the shelves of Lowe's and Home Depot. Although the product has only been on the market for a few months, the users are enthusiastic and word of mouth will help sustain momentum. Because skilled workers are becoming more and more difficult to find, the greatest selling point of this product is the simplicity that allows it to be used by an unskilled workforce.

The investigation went very well. Tom McQueen was extremely gracious and excited about the prospect of winning a NOVA Award. At first glance this solution to rebar tying seems almost too simplistic, but further investigation reveals its many benefits. I feel the jury is faced with a decision on whether to include the competition in this award.* While the competition offers a similar solution to rebar tying, the material characteristics of plastic versus tie wire are very different. Speed-clip offers a definite advantage by not requiring tools for installation. Lowering the price on this product will increase its acceptance in the field. Overall this product has many of the merits that make a solid "NOVA Award Winner."

* The Jury has three basic alternatives.

1. Select the Speed-Clip for the NOVA Award.
2. Select the Speed-Clip and the Kodiklip and/or the Clip-Con Clip for the NOVA Award. In this case the name of the innovation will be changed to something like "Clip-On Concrete Reinforcing Ties."
3. Select none of the clip-on ties for the NOVA Award.

Robert I. Carr, NOVA Award Chair

SELECTED INTERVIEW SUMMARY

Jeff Debernardi
Debernardi Development
207 Spring Street
Pleasanton, CA 94566
(925) 890-3360

Telephone interview by Christine K. Miller, September 1, 2005

Jeff is the owner of Debernardi Development which performs both residential and commercial construction with a 90/10 split respectively. Prior to using the Speed-Clip ties, Jeff used traditional wire tying methods. Now he uses Speed-Clip in 95% of his rebar tying. He did mention that there are some cases because of rebar size, angles, or hanging of rebar when the Speed-Clip ties do not work. Jeff's company primarily does work in slab foundations, driveways, and flatwork in California. He said the clips are simple to use, require no training, and are idiot-proof. He said you don't have to worry about inexperienced workers over tightening ties or ties snapping from improper installation. Within thirty minutes or less his employees are moving along quickly placing approximately one tie every two seconds. He said his employees will actually race on the job to see who can place the most ties. When asked about the higher expense of this product, he said it was completely offset by the increased labor savings through higher productivity and using less skilled workers. Jeff is extremely happy with the product and is now recommending it to his friends and they are testing it in the field.

TESTIMONIAL

Tom McQueen
President
CON-TIE, Inc.
237 Still Creek Road
Danville, CA 94506

1/15/05

Mr. McQueen,

I believe we met at the World Of Concrete Show in Las Vegas. On the last day of the show, in the last few minutes of the show you gave me 200 clips to try - my obligation was to report back to you what I thought.

I had several concerns with the clips - were they really faster than tying rebar in the traditional manner; would they hold rebar while the bar was in chairs and being walked on or beat by the pump hose; and how would the clips do at spliced locations.

We used the 200 clips this past week and they were impressive. They installed easily and rapidly - my foreman estimates that he can install 5 clips in the time it takes to perform one traditional tie. They allowed for easy adjustment of bar location. And, the clips had no problem with the feet of our pour crew or their pump hose. We believe the clips will allow our less experienced workers to place rebar much faster - their improvement should be greater than my foreman's improvement.

We also now know that the clips aid the building of vertical rebar mats - the clips can be installed with one hand quickly while the other hand is holding the bar.

Possibly one of the largest benefits to the clips', although it's a benefit hard to quantify, is that they install so easily there is no fatigue related to "tying" rebar.

We are a small general engineering/general contracting company. We pour a reasonable amount of concrete in a year - about a thousand yards. So we tie rebar, but we don't tie rebar all day every day. When we do tie, if we tie for several hours, our hands, backs, and minds typically get tired. The speed-clips installed fast, easy, and there was no fatigue. We quickly clipped rebar and then went on to do other work - work that I had not anticipated getting to until the next day.

Thanks again for letting us try your product, we want more!

Chet Voss
Voss Construction Corp.
14855 Chispa Road
Atascadero, CA 93422

Engineering News Record Published Article
WORLD OF CONCRETE
Innovation: It's Back 1/21/2005
By Tudor Hampton in Las Vegas

Contractors and engineers looking for a better way to deliver projects found plenty of helpful gadgets, tools and materials during the World of Concrete exhibition, held January 18-21 in Las Vegas. After a solid year of sales in 2004, industry suppliers are investing again in product development and expanding their offerings.

A large contingent of first-time exhibitors added to the mix. About 25% of the 1,600 total suppliers on the exhibit floor made public debuts, according to Tom Cindric, show director. And a huge turnout of visitors added to the excitement. Proving that World of Concrete is a "critical" event, "even in a Conexpo year," was a tough obstacle to overcome, said Cindric. This March, contractors will return to Las Vegas to attend Conexpo-Con/Agg, the largest construction event of the year.

At World of Concrete, the week got off to a roaring start. By day two, attendance had already surpassed 70,000, Cindric said. The show's highest turnout was in 2001, at 77,000, he noted.

Tied Up

New fasteners for reinforcing bar made a splash. Contractors have seen few technology changes in this segment, aside from cordless, rebar-tying tools introduced several years ago.

Two general contractors demonstrated two very different quick-connectors that attracted big crowds. Tom B. McQueen, a general contractor and president of Con-Tie, Danville, Calif., showed off a spring-like rebar clip. It looked like a wire clamp that someone had bent out of shape. Last spring, an associate showed McQueen the clip, which is designed to wrap around rebar and lock it in place during concrete pours.

"I thought it was a great idea," he said, and purchased the manufacturing rights. The clips retail at \$168 per thousand and arrive in packages of 50. Patents are pending.

Jon Kodi, a general contractor and president of Kodi Klip Corp., Lebanon, Tenn., also introduced a rebar fastener. His patented clip is a cube-shaped, plastic design. He made the first prototype at his kitchen table. "I went to Lowe's and bought some PVC pipe," Kodi says. After testing it out, he said to himself, "Man, this is the way it ought to be."

Kodi's clips are made of a polycarbonate material and come in sizes that fit #4, #5 and #6 rebar. They ship in 5-gallon buckets and cost an average \$145 per thousand. On Jan. 3, Kodi received an official endorsement from the ironworkers' union. The clips are designed to secure lap and cross joints in about a second. Plastic clips, invented by Kodi, have union endorsement.

McQueen, too, has high hopes for his wire fastener. "We think the volume is going to be very high," he said, and forecasted selling one billion units in the first year. The company offers clips for #3, #4 and #5 rebar. Rebar clips are wave of the future, say McQueen and wife, Kelly.

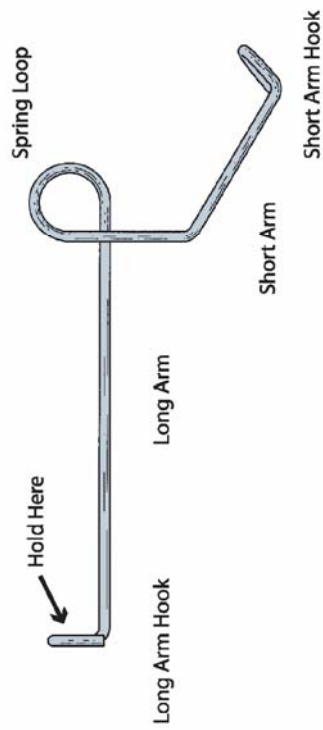
SUPPORTING EXHIBITS

- 0. Exhibit A – Instructions for a Parallel Connection**
- 0. Exhibit B – Instructions for a Perpendicular Connection**
- 0. Exhibit C – Endorsement of Competing Kodiklip product by Ironworkers Local Union in Pennsylvania**

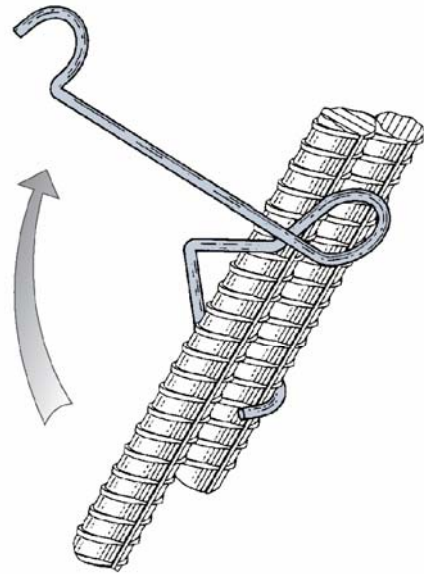
Installation Instructions // Parallel or Splice Connection

www.contie.net/install/

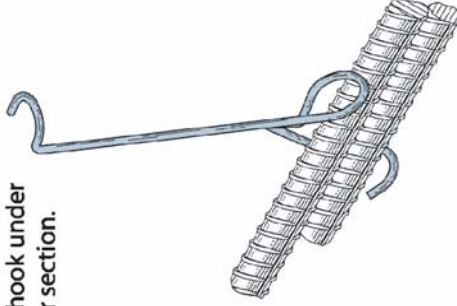
01. Face the rebar so it is perpendicular to your shoulders. Grasp the clip at the end of the long arm and hold it so that the spring loop faces up.



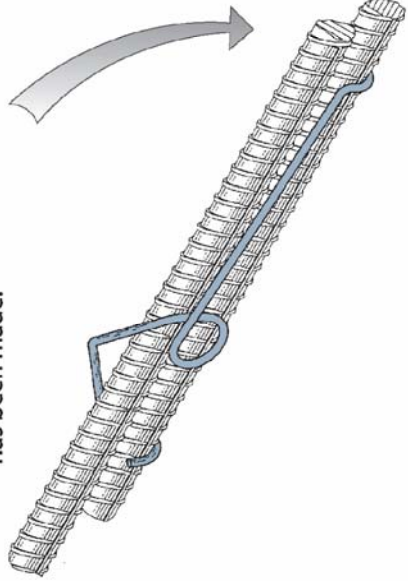
03. Position the spring loop over and past the right side of both rebar.



02. Place the short arm hook under the underlying rebar section.



04. Push the long arm hook down and position under the underlying rebar section and release. The connection has been made!



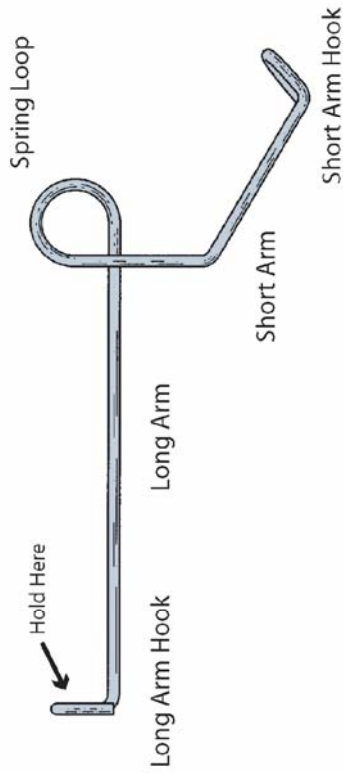
DO NOT CLIMB ON REBAR; SERIOUS INJURY OR DEATH MAY OCCUR. The Speed-Clip connectors are intended for use on horizontal ground-level flat work only. Do not use the speed-clip for any vertical connections higher than you can reach. The Speed-Clip is not designed to hold a persons' weight! Always wear eye protection!



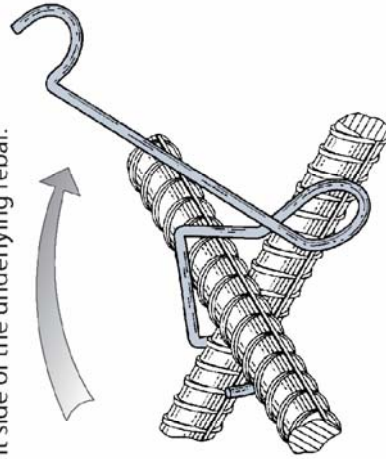
Installation Instructions // Perpendicular or Angle Connection

www.contie.net/install/

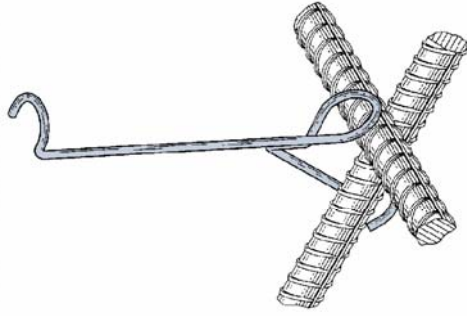
01. Face the overlying rebar section so it is parallel to your shoulders. Grasp the clip at the end of the long arm and hold it so that the spring loop faces up.



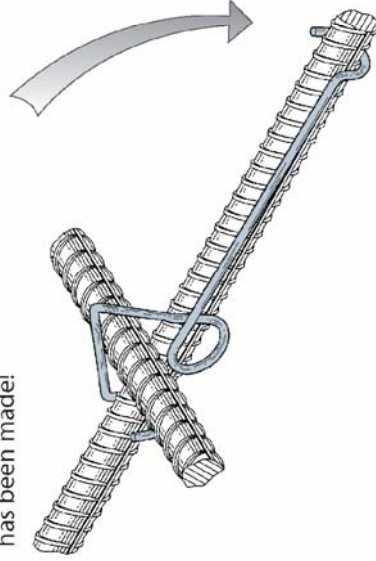
03. Position the spring loop over the overlying rebar section and to the right side of the underlying rebar.



02. Place the short arm hook under the underlying rebar section about 1/2" below the rebar intersection.



04. Push the long arm hook down and position under the underlying rebar section and release. The connection has been made!



DO NOT CLIMB ON REBAR; SERIOUS INJURY OR DEATH MAY OCCUR. The Speed-Clip connectors are intended for use on horizontal ground-level flat work only. Do not use the speed-clip for any vertical connections higher than you can reach. The Speed-Clip is not designed to hold a persons' weight! Always wear eye protection!



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Bridge, Structural, Ornamental and Reinforcing Iron Workers**

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1750 NEW YORK AVE. N.W.
WASHINGTON, D.C. 20006
202 333-4800



January 3, 2005

Mr. Jon Kodi
Kodi Klip – Rebar Connector
314 South Cumberland Street
Lebanon, Tennessee 37087

Dear Mr. Kodi:

This letter will confirm our initial meeting held at International Headquarters on Monday, January 3, 2005 with you as well as various representatives including our Local Union No. 405, Philadelphia, Pennsylvania. I would like to take this opportunity to officially endorse your product on behalf of this International Association and to state that this International is very excited to be on the cutting edge of this great product. This International also recognizes your product as an official tool of the trade to be utilized in the reinforcing aspect of the ironworking industry. We, therefore, look forward to "opening the door" with respect to your innovative product and a future which will be lucrative and beneficial to everyone involved.

With best wishes, I am

Fraternally yours,

A handwritten signature in black ink, which appears to read "Michael A. Fitzpatrick".

General Secretary

MAF:dlt

cc: General President Joseph Hunt
General Treasurer Dennis Toney
General Counsel Ron Gladney
General Vice President Ed McHugh
Local Union No. 405, Philadelphia, Pennsylvania