Con-Tech Systems Ltd. has developed a new more efficient and environmentally friendly foundation system for wind turbines that consumes up to 40% less concrete and up to 70% less reinforcing steel than traditional spread footing foundations. The patented design uses the Groutable Void /Form (GVF) post-tensioning technique whereby a void is created between the top of the ground anchor and the bottom of the concrete cap. The void is expected to collapse as the post-tensioning force is transferred to the ground anchor causing it to move and mobilize soil resistance. After the anchor is post-tensioned and locked off, the void is cement grouted. The PT anchor can now resist compression as well as tension forces thereby increasing foundation stiffness.

**Summary of Cost Estimates**

Foundation construction cost estimates were provided by three qualified potential foundation contractors, CTS engineers estimate and a comparison with spread footing costs are tabulated below in Table 1 and illustrated graphically in Chart 1.

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Unit Cost</th>
<th>Notes/Remarks</th>
<th>% less than spread footing</th>
<th>Project Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor 1</td>
<td>$103,000</td>
<td>60 work days to complete</td>
<td>29%</td>
<td>$4,200,000</td>
</tr>
<tr>
<td>Contractor 2</td>
<td>$94,366</td>
<td>price for 2 units per day</td>
<td>35%</td>
<td>$5,063,400</td>
</tr>
<tr>
<td>Contractor 3</td>
<td>$83,295</td>
<td>50 work days to complete</td>
<td>43%</td>
<td>$6,170,500</td>
</tr>
<tr>
<td>CTS engineers estimate</td>
<td>$84,334</td>
<td></td>
<td>42%</td>
<td>$6,066,600</td>
</tr>
<tr>
<td>Spread Foundation in Rock</td>
<td>$145,000</td>
<td>For Comparison</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1

*Project Savings are potential cost savings for 100 foundations vs. spread footing design.

Note: Cost estimates do not include embedment ring and tower anchor bolts grounding and conduit.

Preliminary contractor cost estimates indicate a potential savings of 30% to 40% over a conventional spread footing design. The CTS alternative foundation design for wind turbines with GVF technology is currently under review by Germanischer Lloyd for certification.
Canadian Patent ... continued

All foundation construction cost estimates for the CTS Post-tensioned Ground Anchor Foundation System with Groutable Void Form (GVF) patent pending in rock are well below the spread footing cost provided for comparison.

Contractors Average Construction Cost: $93,554
CTS Engineers Estimate Construction Cost: $84,334

Reductions Contributing to Improvement in Foundation Efficiency

- Over 75% reduction in foundation area
- Over 40% reduction in concrete consumption
- Over 70% reduction in reinforcing steel consumption
- 29% to 43% preliminary estimated total cost reduction

CTS Alternative Foundation Design Objectives:
Provide a Post-Tensioned Ground Anchor Foundation System for Wind Turbine Foundations with the following characteristics:

- Design and construct PT ground anchors to achieve design load with the required factor of safety.
- Provide a rigid foundation to resist extreme overturning moments while limiting the pile cap size.
- Improve rotational stiffness and reduce movement of the foundation through post-tensioning.
- Reduce consumption of concrete and steel reinforcing to optimize foundation efficiency and performance.

For more information on this patent, or any of our products and services, please contact: Josef Alter at: joe@contechsystems.com, or any of our other sales team at con-tech@contechsystems.com

Con-Tech Systems receives recognition from the ADSC:
Con-Tech Systems Ltd. is proud to announce that we were presented with the “Associate Member of the Year” award for 2012 by the ADSC at the West Coast Chapter annual meeting in Anaheim May of this year! CTS’s Joe Alter accepted the award on behalf of the team at Con-Tech Systems which was presented by Al Rasband and John Dillenburg of the ADSC. Con-Tech Systems was recognised for its active continued support of, and generous donations to, the ADSC WCC. We would like to officially thank the ADSC for this honour!
**Feature Project: “Kew Gardens Interchange”, Queens, New York**

New York City is a bustling metropolis, both in people and in infrastructure. When Nicholson Construction Company first received bid documents for a major interchange contract on the Van Wyck Expressway (Interstate 678) in the Kew Gardens section of Queens, New York, they turned to Con-Tech Systems Ltd. for a competitive price, quality materials, and timely delivery on the anchor portion of the work.

The $160 million project included temporary and permanent strand tiebacks on one of the busiest thoroughfares in New York City. I-678 runs north to south from the Whitestone Bridge to John F. Kennedy Airport carrying over 160,000 cars daily, accounting for 8% of New York City’s peak traffic volume. Once Nicholson was awarded the project after the bid process and revisions, they contacted the CTS team and gave the green light to begin producing the strand anchors. Over a series of releases, Con-Tech pushed over 46,000 linear feet of strand cable into 237 temporary and permanent strand anchors in 3, 4, and 5 strand configurations. The tiebacks were up to 61 feet in length.

Like the City, most major infrastructure projects are subject to numerous changes over the life of the job. According to Justin Lukens, Asst. Project Manager, “Con-Tech was able to meet and exceed Nicholson’s needs on a job with a very demanding and uncertain schedule. (They) delivered on time, on budget, quality materials in order to meet our needs.” CTS was repeatedly called on to meet changing deadlines and also changes to the original anchor plans. Con-Tech Systems Ltd. would like to sincerely thank Nicholson Construction Company for awarding us this project.

**Owner:** NYS DOT  
**Contractor:** Nicholson Construction Company (a subsidiary of SOLETANCHE BACHY)  
**Project Location:** Queens, New York  
**Project Start Date:** April 2011  
**Project Completion:** ongoing, Summer 2013 for anchor portion; 2016 anticipated project end

**CTS materials used:**
- Con-Tech Systems Ltd. DCP and SCP strand anchors  
- Con-Tech Systems Ltd. Strand hardware
**Announcement:** As of June 1st, 2012 we have shutdown our Shafter, CA manufacturing facility. With our keen focus on top quality products and prompt delivery we look forward to the continued success of providing you with all of your project needs through our many other locations ~ no matter where the location of your job. We sincerely thank the staff at the Shafter location for their dedication to the company over the past many years and wish them all the very best in the future.

**E-MAIL:** ctswest@contechsystems.com  
E-MAIL: ctseast@contechsystems.com

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**Special Thanks also to:**  
**Justin Lukens**  
Assistant Project Manager

**Nicholson Construction Company**  
a subsidiary of SOLENTANCHE BACHY  
New York District Office  
15 Wilson Drive, Suite A  
Sparta, NJ 07871  
http://www.nicholsonconstruction.com

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**Con-Tech Systems’ new Machine Shop:**

Con-Tech Systems is proud to announce the hiring of Brent Smith as our Machine Shop Manager and the purchasing of the specialized equipment required to start our own machine shop. Brent started BDS Machining in 2004 and CTS was one of his first customers. He started out renting only a manual mill and manual lathe, but soon purchased a CNC vertical machining center capable of machining our anchor heads and stressing equipment. Con-Tech Systems Ltd. now has the capabilities to do all of our own metalizing. This automated process was custom designed by Brent to accommodate many of our Titan products.

Brent’s years of experience in machining, hydraulics, electronics, PLC’s, fabrication, and pneumatics have already proven to be a tremendous contribution to CTS. Brent’s long time employee, Will Holder has also made the move to CTS. His skills as a fabricator, machinist, and mechanic are a great asset as well. Con-Tech is pleased to welcome both Brent and Will to our staff.

Both Con-Tech Systems and Brent are looking forward to what lies ahead. Brent has been proud to work with CTS as a supplier and friend, and is now eager to contribute as part of the Con-Tech family.

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**Special Thanks to:**  
**Sean Condon**  
Field Engineer

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For more information about this project please contact:  
Denis Ambio at d.ambio@contechsystems.com

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“Pioneering Geo-Technical Solutions”