

Lang Tool Co. Statement of Qualifications ISCO Soil Mixing



Lang Tool Co. was formed 1993. The company produced modified excavators and specialized attachments mostly for forestry applications. In 1997 Lang Tool Co. was approached by the IteX company concerning equipment for stabilizing dredge material coming out of the New York-New Jersey harbor. The operation that IteX envisioned required large, high production machines that could stir cement slurry into large barges containing the dredge material. Lang Tool Co. built up two modified excavators with custom built blender attachments. This launched the Lang Tool Co. venture into producing soil mixing equipment.



Lang Tool Co. went on to design and manufacture soil blenders that have been used on remediation projects from Argentina to the Aleutian Islands. In addition to blenders Lang Tool Co. also produced reagent delivery equipment for ISCO and ISS soil mixing. In 2008 Lang Tool Co. produced the Dual Axis Blender and began to move into contracting.



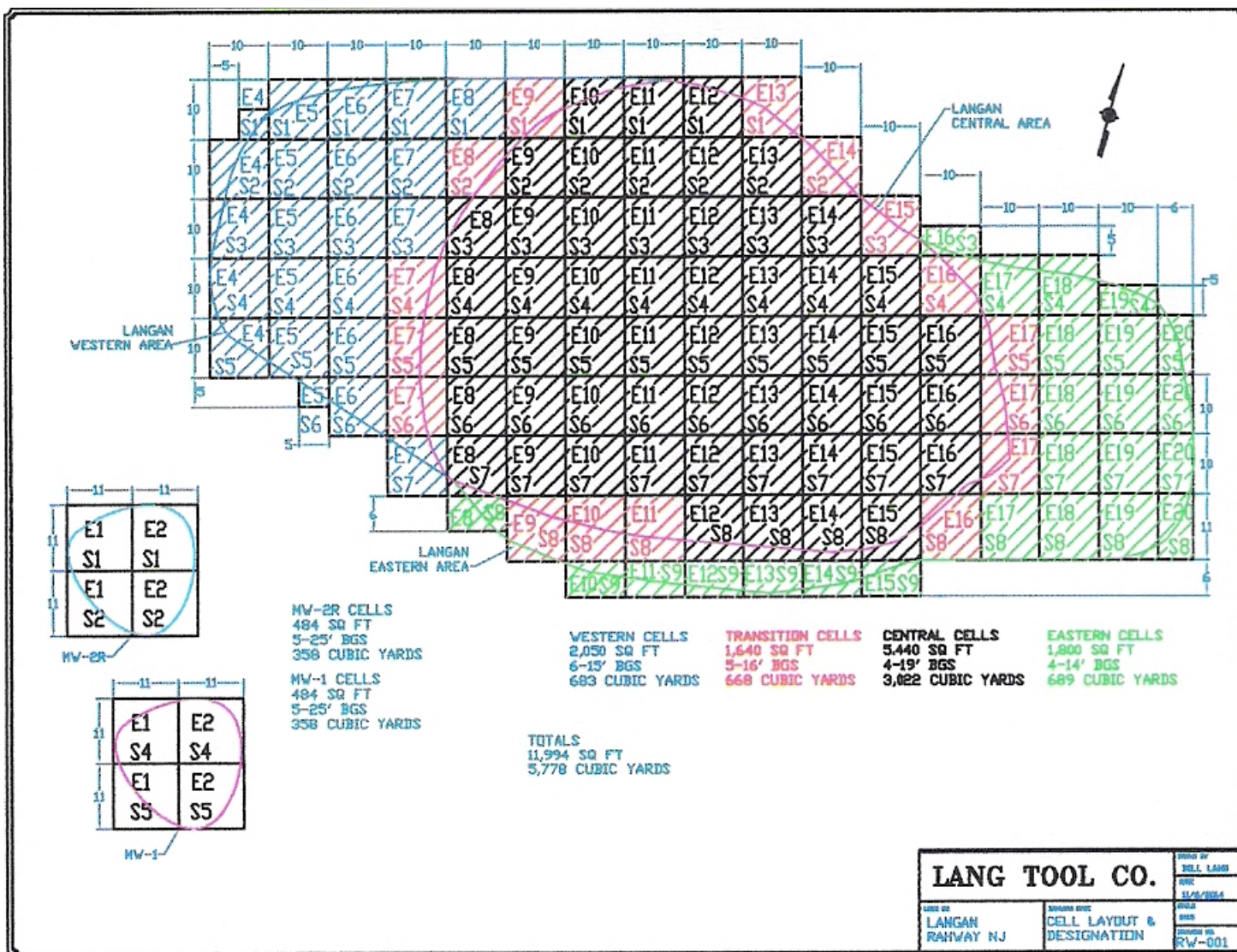
The LTC designed and manufactured Dual Axis blender is unique in that the main drill stem turns on a vertical axis while the drums on the lower horizontal axis counter-rotate. Powered by a 490 hp engine, the DAB produces a violent mixing action. The reagent plumbing outlet is in the middle of the mixing action. The DAB has been used successfully on a multitude of projects including those involving a chemical oxidation process in hard glacial till clay. Equipped with GPS the Dual Axis Blender knows where it's going and where it's been.

Lang Tool Co. has used its manufacturing and engineering abilities to produce extremely productive and accurate reagent delivery equipment. This equipment was designed to be easily transported and set up on the job. The ISCO reagent plant has a computerized system that will simultaneously deliver dry reagent from a bin, liquid reagent from barrels or totes and water into a mixing tank. The quantity of these components is entered into the system, which will shut the delivery of each component off when the entered quantity is reached. There are two mixing tanks so while one tank is filling reagent solution can be pumped from the other.



The outgoing quantity of reagent solution is entered. The system will shut the delivery off when the entered quantity is reached. The LTC ISCO reagent delivery plant has been used for persulfate, permanganate, Regenox, Modified Fentons Reagent, Daramend, ZVI & biological reagents.

Lang Tool Co. uses GPS to enhance the productivity and accuracy of the ISS operations that it performs. A CAD drawing of the site with a mixing cell layout and designation is produced and uploaded into the DAB onboard computer. The drawing below was for the Former M&T site in Rahway, New Jersey.



The GPS equipment allows the Dual Axis Blender operator to see the cell layout, the cell designation, the mixing tool and the distance to the target mixing elevation. The operator can zoom in and out to get the best perspective for any given situation. The screen is color coded. When the mixing tool reaches the target elevation the screen turns green in that area. When the mixing tool goes below the target elevation the screen turns red. The colored screen can be downloaded from the DAB computer and put into daily and final reports showing that the treatment area has been mixed to the specified depth.



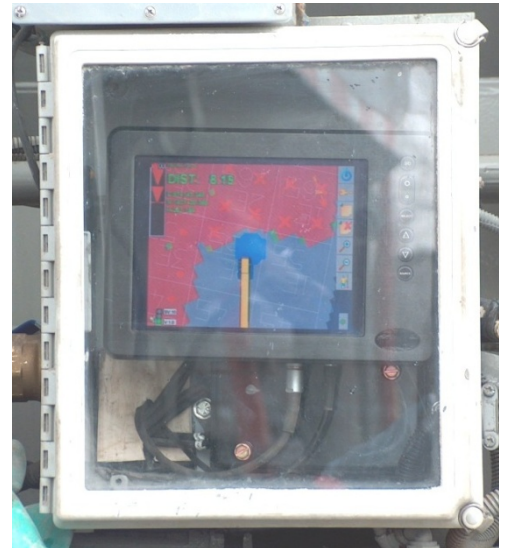
A spreadsheet that matches the cell layout drawing is produced for the Reagent Plant crew that lists the quantity of reagent components for each cell. The cell quantities sheet is part of an Excel workbook. The sheet below is for the Former M&T site project as is the drawing on the preceding page.

		E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	E19	E20
H2O S1		442	442		130	353	383	414	444	389	510	525	525	427			Stockpiled Material on Plastic				314
Klozur# S1		1,431	1,431		189	513	557	602	645	757	991	1,021	1,021	830							306
NaOH# S1		1,064	1,064		183	498	541	584	626	725	949	978	978	794							297
FeEDTA		7	7		1.0	5.0	5.0	3.0	3.0	4.0	4.0	5.0	5.0	4.0							
Solution Gal		520	520		147	398	433	467	501	474	621	640	640	520							
H2O S2		442	442		424	424	563	563	460	525	525	525	525	525	427						
Klozur# S2		1,431	1,431		617	617	819	819	893	1,021	1,021	1,185	1,422	1,185	1,156						
NaOH# S2		1,064	1,064		599	599	794	794	856	948	948	948	996	948	809						
FeEDTA		7	7		0	3	4	4	0	0	0	5.0	0	0.0	4.0						
Solution Gal		520	520		479	479	636	636	560	640	640	640	640	640	520						
H2O S3					520	520	520	520	525	525	525	525	525	525	525	427	169				
Klozur# S3					978	889	889	889	1,185	1,304	1,422	1,422	1,185	1,185	1,185	963	282				
NaOH# S3					622	622	578	622	770	889	889	889	948	889	996	819	342				
FeEDTA					4.0	4.0	10.5	4.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0				
Solution Gal					587	587	587	587	640	640	640	640	640	640	640	520	198				
H2O S4		422	422		520	520	520	427	525	525	525	525	525	525	525	525	427	338	675	154	
Klozur# S4		1,145	818		978	978	978	1,156	1,422	1,422	1,021	1,021	1,021	1,021	1,021	1,021	830	565	1,129	257	
NaOH# S4		1,029	711		622	622	622	626	770	770	840	840	840	819	711	996	809	684	1,369	311	
FeEDTA		7.0	21.0		9.0	3.0	3.0	4.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0	5.0	4.0	4.0	0.0	0.0	
Solution		520	520		587	587	587	520	640	640	660	660	660	640	640	640	520	396	791	180	
H2O S5		422	422		520	520	520	427	525	525	525	525	525	525	525	525	525	394	338	338	203
Klozur# S5		1,145	818		756	756	756	830	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,021	766	565	565	339
NaOH# S5		1,029	711		601	533	533	602	642	642	642	642	741	996	996	996	996	747	604	604	411
FeEDTA		21	7		0.0	11.0	11.0	12.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	11.0	10.0	10.0	6.0
Solution Gal		520	520		601	587	587	520	640	640	640	640	640	640	640	640	640	480	396	396	237
H2O S6					141	563	427	525	525	525	525	525	525	525	525	525	1,060	861	338	338	203
Klozur# S6					205	819	830	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,021	2,043	1,660	565	565	339
NaOH# S6					130	521	521	642	642	642	642	642	642	642	515	652	729	592	501	501	212
FeEDTA					3.0	12.0	12.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	11.0	14.0	12.0	10.0	10.0	6.0
Solution					159	636	520	640	640	640	640	640	640	640	640	640	1,221	992	396	396	237
H2O S7								433	525	525	525	525	565	565	565	565	1,060	861	338	338	203
Klozur# S7								630	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,021	2,043	1,660	565	565	339
NaOH# S7								370	652	580	580	580	468	468	468	728	729	592	501	501	269
FeEDTA								9.0	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	11.0	10.0	0.0	0.0
Solution Gal								489	640	640	640	640	683	683	683	683	1,221	992	396	396	264
H2O S8									205	416	466	466	767	622	647	647	910	759	338	338	223
Klozur# S8									385	892	842	842	1,353	1,123	1,169	1,169	1,754	1,462	565	565	389
NaOH# S8									180	301	386	386	783	515	509	509	676	563	326	487	224
FeEDTA									0.0	0.0	0.0	0.0	0.0	0.0	25.0	4.0	4.0	0.0	0.0	0.0	0.0
Solution Gal									240	485	563	563	704	751	751	751	1,091	923	484	484	290
H2O S9											205	205	205	205	205	205					
Klozur# S9											385	385	385	385	385	385					
NaOH# S9											180	180	180	180	180	180					
FeEDTA											0	0	0	0	0	0					
Solution Gal											240	240	240	240	240	240					

MT Reagent Cell Qty 05_19_15-Final

As shown on the drawing, this site had several different mixing levels. Additionally there was a different mix design for Central Cells, Western Cells, Eastern Cells, Transition Cells and the MW cells in the remote locations. Many ISCO jobs have a wide range of cell reagent quantities due to the difference in cell soil volume, differing target elevations and varying levels of contamination found in different parts of the site. Also, frequently site conditions are found to be different than anticipated and it is necessary to make changes in the mix designs and mixing levels quickly and accurately. The workbook sheet shown above listing the cell quantities is the first sheet in an Excel workbook made for the project. The Cell Quantities sheet draws its information from the Soil Volume sheet that contains the area and target mixing elevation for each cell and the Mix sheet that contains the mix designs. Changes in mixing target elevation and mix design can be made on the appropriate sheet and the changes in cell reagent quantities will feed through to the Cell Quantities sheet. Lang Tool Co. maintains a printer on site so that revised Cell Quantity sheets can be quickly provided to the Reagent Plant operator. To ensure accuracy of delivery it is essential that the Reagent Plant operator is certain of which cell the blender is mixing in and to have realtime information on the rate of mixing production so that the rate of reagent delivery can be adjusted to match. LTC reagent delivery equipment is designed to provide that information to the operator in realtime.

The DAB screen is broadcast to a screen on the slurry mixing plant so that the plant operator has realtime information on which cell the blender is working in and the mixing progress. This avoids confusion and allows the plant operator to match the rate of reagent delivery to the rate of mixing progress.



The operator sees the rate of delivery and the progress toward the entered quantity. The plant operator can adjust the rate of delivery to match the rate of mixing progress shown on the screen. When the entered quantity of reagent is reached the system shuts off.

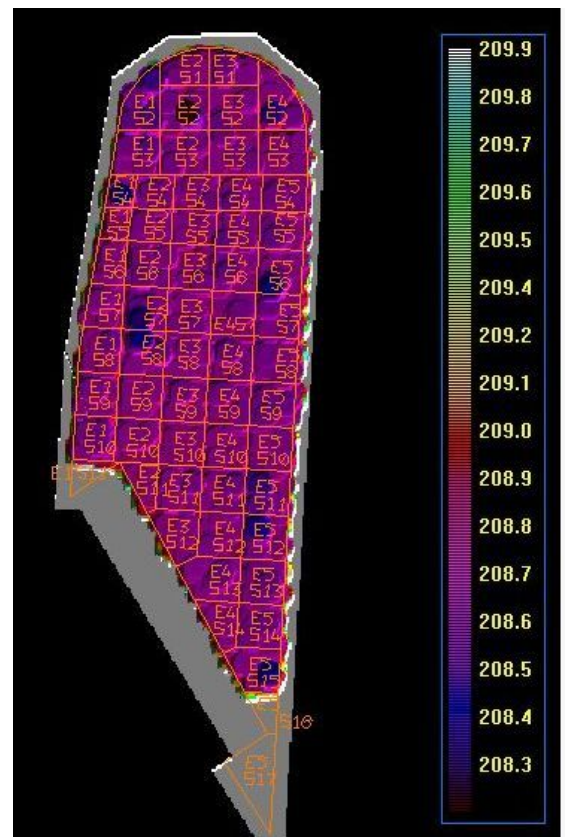
The chart at the right was downloaded from the Dual Axis Blender computer at the conclusion of a project in Brantford, Ontario. The target ISS bottom elevation was 209 meters above MSL. The chart shows that the entire treatment area was mixed to slightly below the target depth. The uncompleted cells at the bottom of the chart were originally specified to be mixed. However, they were on the property border and within the drip line of trees in the neighboring lawns. These areas were treated by injection to protect the trees.

The DAB operator also records the coordinates of the bottom elevation in the quadrants of each mixing cell. As shown below.

Easting	Northing	Elevation
,559309.267902	,4777317.986077	,208.876343
,559310.826708	,4777317.664336	,208.955063
,559309.520577	,4777319.161112	,208.963379
,559310.764210	,4777319.121131	,208.977905

A progress chart, and cell quadrant coordinate information is included in the LTC daily and final reports.

Lang Tool Co. equipment coupled with the work procedures developed by Lang Tool Co. employees is extremely productive, extremely accurate and designed so that complete and accurate mixing can be easily verified. This combination of productivity, accuracy and verification results in successful projects completed ahead of schedule. Information on recent ISSCO projects is listed on the next page. Numerous ISS projects were also completed in this time frame using the Dual Axis Blender and the LTC ISS delivery plant. The ISS plant has similar delivery accuracy and verification characteristics.



Umicore USA Inc. Facility Maxton, Scotland County, North Carolina

The project involved treating 6,250 cubic yards of cobalt impacted soil with magnesium oxide. The site was a former recycling facility.

- Owner- Umicore USA, Inc.
- Prime Contractor- Clean Harbors Environmental Services
Contact Bob Carr
(339) 793-0453 carr.robert@cleanharbors.com
- Date of Completion- June 2017
- Engineer- Duncklee & Dunhan
Contact Matt Flinchum
511 Keisler Drive, Suite 102
Cary, NC 27518
(919) 858-9898 x 206 matt@dunckleedunham.com

Chevron Tract 34 Site Salem, Illinois

The project involved treating 6,548 cubic yards of soil contaminated with hexavalent chrome using calcium polysulfide.

- Owner- Chevron Environmental Management Co.
- Prime Contractor- Stantec
Contact Matt Carlson
2321 Club Meridian Drive Suite E
Okemos, MI 48864
(517) 349-9499 Matthew.Carlson@stantec.com
- Date of Completion- November 2016
- Engineer- Stantec
- Regulatory Agency- Illinois Environmental Protection Agency

Pilot Test at the Amtrak Former Fueling Facility Wilmington, Delaware

A variety of reagents and mix designs were tested on soil bordering and in the drainage way that runs through the former fueling facility.

- Owner- Amtrak
- Prime Contractor- Stantec
Contact Frank Aceto
1060 Andrew Drive, Suite 140
West Chester, PA 19380
(610) 840-2566 Frank.Aceto@stantec.com
- Date of Completion- August of 2016
- Engineer- Stantec
- Regulatory Agency- Delaware Department of Natural Resources and Environmental Control
US Environmental Protection Agency

Sydenham-Pearl Brownfield Remediation Project, Brantford, Ontario Canada

This project involved treating 1,871 cubic meters (2,447 cubic yards) of contaminated soil with Zero Valent Iron between 212.5- 214.5 m MSL and 209 m MSL. Lang Tool Co. completed the soil mixing in a little over 3 working days. The project was completed and the equipment decontaminated and readied for transport by noon on the 4th day.

- Owner- City of Brantford
- Prime Contractor- Milestone Environmental Contractors, Inc.

Contact Wayne Harris
80 Birmingham Street, Suite B2
Toronto, ON M8V 3W6
(416) 214-4197 wayneh@milestoneenv.ca

- Date of Completion- November 2015
- Engineer- CH2M Hill
72 Victoria Street South, Suite 300
Kitchener, ON
N2G 4Y9

Former Kearsarge Metallurgical Corporation Superfund Site, Conway New Hampshire

This project involved clearing the wooded site, installing silt and perimeter fencing, monitoring well protection, excavating approximately 6' of clean soil, and mixing a Modified Fenton's Reagent into 3,000 cubic yards of contaminated soil. Lang Tool Co. and ISOTEC teamed up to accomplish the clearing, fencing, well protection and preliminary excavating in two days. Soil mixing with excavation proceeding inconjunction was completed in 6 working days. Laboratory tests indicated that the entire site met the cleanup objectives the day after soil mixing was completed.

- Owner- Hurteau Heating Services
- Prime Contractor- ISOTEC Contact Prasad Kakarla
11 Princess Rd. Suite A
Lawrenceville, NJ 08648
(609) 275-8500 ext 111
pkakarla@insituoxidation.com
- Date of Completion- September 21, 2015
- Engineer- Weston Solutions, Inc. Contact Steve Skinner
1400 Weston Way
West Chester PA 19380
(601) 701-3487
Stephen.skinner@westonsolutions.com

Former M&T Chemicals Facility, Rahway New Jersey

This project involved treating 6,568 cubic yards of contaminated soil with sodium persulfate activated with FeEDTA. There were several different soil mixing target elevations and four different mix designs as the contamination levels and elevations varied widely throughout the site. On site tests indicated that the top elevations of the contaminants and natural iron levels were substantially different than what the site assessment indicated. Numerous field changes were made throughout the course of the soil mixing operation. The project was completed successfully on schedule.

- Owner- Retia USA Contact Gary Shelby
468 Thomas Jones Way #150
Exton, PA 19341-2528
Phone (610) 594-4425 gary.shelby@total.com
- Prime Contractor- Viasant, LLC Contact Chris McGhee
Phone (832) 593-3733 cmcgee@viasant.com
- Date of Completion- May 2015
- Engineer- Langan Engineering & Environmental Services Contact Kate Larkin
2700 Kelly Rd, Suite 200
Warrington, PA 18976
(215) 491-6500

Danfoss Site, Ames Iowa

The project involved treating 3,200 cubic yards of contaminated soil with Klorox persulfate activated with NaOH. Lang Tool Co. performed the necessary excavation and swell containment.

- Owner Danfoss North America
- Prime Contractor- Lang Tool Co. dba Doyle & Lang, LLC
- Date of Completion- May 2014
- Regulatory Agency- US Environmental Protection Agency Region 7
- Engineer- Fehr Graham Contact Jeff Ogden

221 E. Main Street, Suite 200
Freeport, Illinois 61032
Phone (815) 235-7643
JOgden@fehr-graham.com

Meijer Site Milwaukee, Wisconsin

The project involved treating 750 cubic yards of contaminated soil with sodium permanganate solution.

- Owner- Meijer, Inc.
- Prime Contractor- Environmental Services Plus Contact Jesse Rose

PO Box 187
W1734 KenDale Dr.
Kaukauna, WI. 54130
Phone (920) 766-6756

jesse@environmentalservicesplus.com

- Date of Completion – July 2014
- Regulatory Agency- Wisconsin Department of Natural Resources
- Engineer GEI Consultants Contact Paul Killian

3159 Voyager Drive
Green Bay, WI 54311
Phone (920) 455-8200

pkillian@geiconsultants.com