#0512

SCHENCK
Balancing & Diagnostic Systems

balancing news

Information for the quality and performance of rotating equipment - From the Schenck Balancing & Diagnostic Systems Group

Celebrating Schenck Trebel's New Look

Post Renovations Open House

IN THIS ISSUE:

In October of 2011, we began a complete renovation and overhaul of our New York office. It is now complete.

In celebration of our building's new look, we held an open house May 5th. Our guests and friends in attendance were greeted by Schenck Trebel staff and broken into groups for presentations, demonstrations and tours of our new facility and workshop.

Our New Lobby - inclusive of new artwork and furniture

Presentations were held in the new Executive Conference and Training Rooms. Participants were given presentations on Schenck products and services including our Vibro - Machine Health- condition monitoring and diagnostic systems. Demonstrations were held in our Learning Center - furnished with hands-on state-of-the-art equipment, educational literature, white papers and marketing collaterals.

Schenck Learning Center

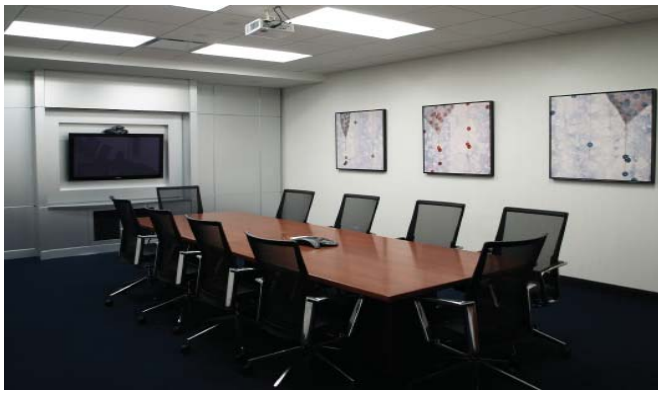
Schenck Training Room

Like our Learning Center, our training room is an excellent source of education, built with our customers in mind - the room seats up to 30 people comfortably and provides a setting of comfort and learning fit for any Schenck student.

Celebrating Schenck Trebel's New Look (continued...)

Patrise Heins, Human Resources Manager of Schenck Trebel says, "We are extremely pleased with the office renovation. The professional look reflects well on the company and has been well received by our staff. The new office offers an environment that allows for more collaboration and teamwork, which has had a positive impact on productivity. It was well worth the effort."

Executive Conference Room (Before)



Executive Conference Room (After)

For food and entertainment, the Schenck Trebel staff provided a Backyard Lunch and Barbecue. In conjunction with the barbecue, the new cafeteria provided opportunities for photos, video reviews, giveaways and an exhibition of Schenck Trebel's community involvement with Local High School Sachem North.

Main Office Before

Main Office After

Schenck Corporation CEO Bertram Dittmar stated: "The fascination of vibration analysis as well as information about Schenck's position within the Duerr group were well received by our guests.

At the end of the day, everybody agreed that our new office is a reflection of Schenck's position in the market place: providing sophisticated high-tech products and services to our customers in North America."

Schenck Trebel would like to thank all who were involved in the planning and attendance of this successful event. We also invite you to come in and/or inquire about our future trainings and seminars in our new Training room and Learning center. It is well worth the visit.

For more information on our educational facilities, products and services, please visit Schenck Trebel at: http://www.schenck-usa.

Schenck Success Stories

Joe Gibbs Racing

The Challenge

When the Joe Gibbs Racing Team received driver complaints about driveline vibration they approached Schenck about balancing some driveshafts. They needed help to develop a balancing process, find a partner to assist with balancing tooling, identify rotor behavior, and of course find a reputable provider of these services. They asked Schenck Balancing Services to evaluate and balance their newly designed driveshaft for their NASCAR racing needs. Most successful teams and shops demand high quality products and services and each component must meet these high standards. Joe Gibbs Racing looked to Schenck to provide the balancing expertise and service they needed to help keep them at the top of the sport.

The Solution

Schenck began by becoming familiar with the new design and how it compared to the design currently being used throughout the sport. Schenck evaluated the need for special fixtures to hold the shaft in the balancer in a way that is similar to how it is held in service. This evaluation included reviewing customer drawings and specifications as well as understanding how the driveshaft will operate in service. The balancing of the driveshaft assembly required determining an appropriate balancing procedure to help minimize and reduce errors and effects from the tooling fixtures. In addition, it was necessary to identify how to apply the correction weights and ultimately hold them on the shafts at the balancing speed of the assembly. Working closely with the engineers at Joe Gibbs Racing to meet their requirements, Schenck established a procedure, through a series of testing and analysis, to balance and correct the customer's driveshaft to a tighter tolerance than what was currently being used.

With a focus on quality improvement and turnaround, Schenck and the team from Joe Gibbs Racing installed the tooling, balanced the tooling, fine tuned the balancing process and balanced an initial batch of driveshafts. The tooling fixtures were mounted to our Schenck Model HK40 High Speed Driveshaft balancing machine at our Deer Park, NY facility and a balancing method developed and utilized to balance several shafts.

The Result

Schenck's In-House Balancing Service worked closely with Joe Gibbs Racing and utilized its specially designed driveshaft balancing machine, and CAB 920 balancing instrument with the appropriate software functions which resulted in very well balanced driveshafts. The improved shaft design, assembly, and control over the balancing process, have resulted in superior vibration measurements made on dynamometers at the Joe Gibbs Racing facility in Huntsville, NC as well as on the track.

The final result is no reported complaints of driveline vibration by their team of drivers with the current driveshafts balanced exclusively on the Schenck HK40 balancer. Several batches of driveshafts have been balanced successfully, tested by Joe Gibbs Racing to 9600 rpm (about 205 mph), run on test tracks, and run successfully on race days by all three Joe Gibbs Racing teams in the NASCAR Sprint Cup and Nationwide Series'. The minimized driveline vibration directly results in increased horsepower and performance!!

Schenck's services and assistance included:

- Application Engineering assistance
- Establishment of the proper balancing tolerance
- Identification of the correct tooling
- Availability of the HK40 High Speed Driveshaft balancing machine for balancing services
- Development of the measurement and correction processes

The Schenck HK40 High Speed Driveshaft balancing machine is well suited for balancing automotive driveshafts, as well as balancing jet engine and helicopter shafts. The HK40 at our NY facility is utilized to provide high speed balancing of these components as well as providing information on vibration, bending, and first critical and sub-harmonic excitations throughout the specified speed ranges.

The SmartBalancer

Successful Field Balancing

Anyone having experience with machinery diagnostics knows that vibration can be caused by a broad range of problems. These can include worn bearings, misalignment of components, mechanical looseness, improper or damaged foundations, hydraulic and aerodynamic forces, resonances, etc.

Probably the most common problem is unbalance. Unbalance (an uneven distribution of mass around the axis of rotation) can result when individual components have not been properly balanced prior to assembly, errors in the assembly of these components, or operation conditions.

The high centrifugal forces generated by unbalanced rotors during operation can lead to premature bearing failure, fatigue fractures, foundation deterioration and shaft deformation, just to mention a few. Unbalanced rotors can also cause safety hazards to personnel. For these reasons, well balanced machinery is a necessity for any maintenance or safety program.

Unlike balancing a rotor in the controlled and predictable environment, field balancing presents a number of unique challenges: determining that the vibration is actually the result of an unbalance and/or making the decision to balance without first verifying that an unbalance condition exists - both of which could result in wasted time and money.

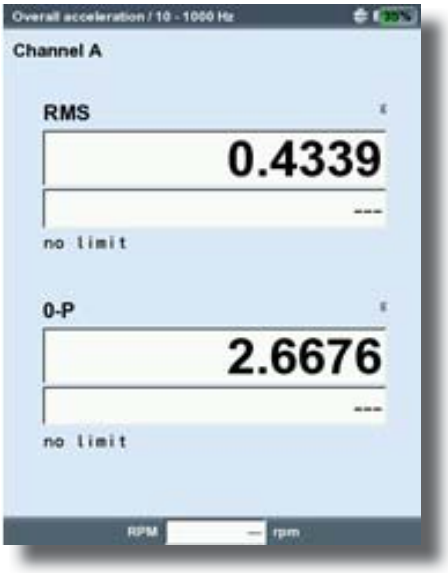
To ensure successful field balancing, today's vibration analyst needs certain tools which will quickly and efficiently allow him to verify that an unbalance exists and at what operating conditions balancing is best attempted. These diagnostic tools are outlined below:

- Vibration overall measurement
- Frequency analysis
- Order tracking analysis
- Time waveforms
- Balancing vector calculator
- Phase measurement
- PC upload and remote control capability
- Bearing condition unit

Schenck's newest line of SmartBalancer field balancing equipment integrates all these functions with ease. The SmartBalancer features a large illuminated color display, 2 channels for vibration including one channel for speed / phase reference, a long life (8hr) battery and all necessary accessories (cables, magnets, etc.). It comes with everything you need to get started:

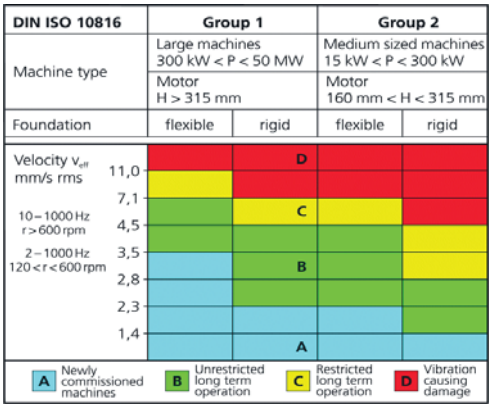
- 2 acceleration sensors
- CD-ROM
- 1 laser reference pickup
- Hard shell carrying case
- Magnetic stand and mounting accessories
- Combined power supply/unit charger
- Connection cables

Measurement of vibration is the simplest vibration measurement - it represents the sum of the total energy content within a fixed frequency range. The value can be exhibited by putting your hand on the machine to assess or compare its behavior to normal conditions. Using a hands-on instrument to assign a value allows you to compare your machine in a more repetitive and accurate way.

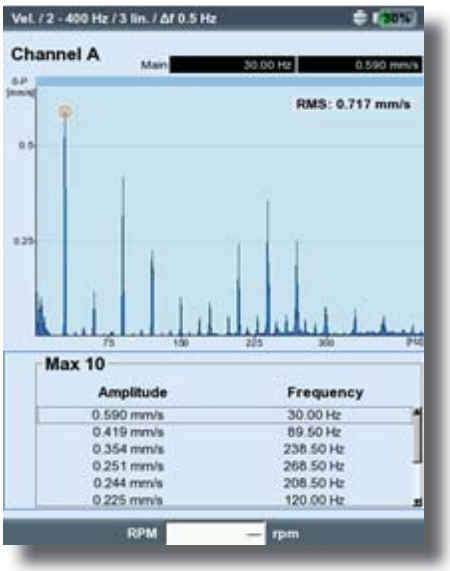


Schenck's SmartBalancer gives the user the capability to effectively measure and record the vibration overall values with a range of units (acceleration, velocity, displacement) and values (RMS, peak, peak – peak, & crest). Measuring the complete vibration at various points on the machine allows for comparison with local and international standards (ISO, API, DIN, etc.). If this comparison then concludes that the levels are excessive and further analysis shows that field balancing is required, the first step should always be to document the vibration overall value.

FACT: Regardless of what methods are employed to resolve a vibration issue, documenting the vibration overall is always the first step.

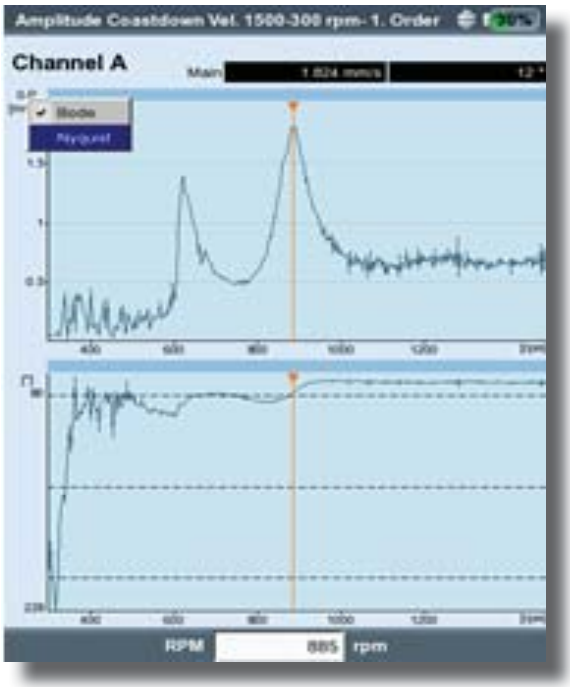


Frequency analysis (the FFT function) is the most valuable tool used when analyzing vibration. It gives the user the ability to take an overall vibration and convert it into a frequency domain so the user can see the individual frequencies. This function is called "FFT" (Fast Fourier Transform). It allows the vibration analyst to see the frequencies that represent the most severe vibration. By correlating the measured frequencies with the machine components or the interaction between components, makes it possible to pinpoint the problem.



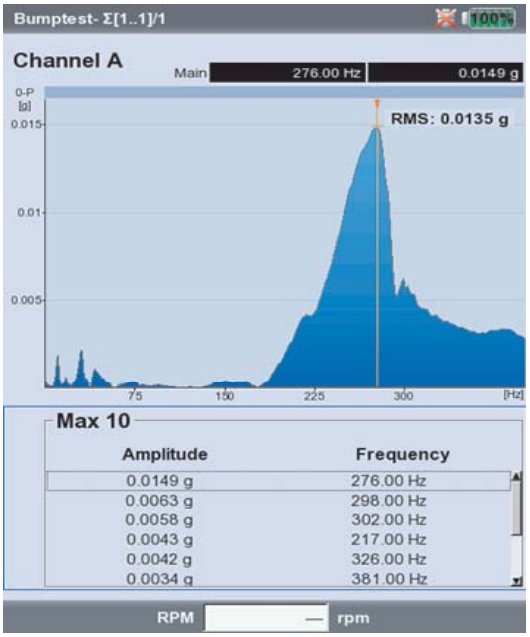
While overall vibration can result from a multitude of problems - each having its own signature on a spectrum, high vibration due to unbalance occurs when rotational frequency of a particular component is out of balance. The SmartBalancer gives the user the capability of measuring from 2 -12.8kHz with 6400 lines. This provides just the right amount of resolution to accurately determine if there is a problem. It goes without saying that balancing without there being an unbalance problem is a waste of time and effort. Therefore, an FFT spectrum is essential in determining whether balancing is the proper course of action verses drive alignment, foundation repair, etc.

Tracking function uses a reference sensor, such as a laser sensor, to lock onto the vibration frequency corresponding to the running speed of a rotating machine. The SmartBalancer uses a laser pickup that has a working range of 2m. Tracking this vibration component (i.e. amplitude, phase) during run-up or coast-down helps one to see how the rotor responds at various speeds. In addition to being a necessity for Bode and Nyquist plots, the Tracking Function makes it possible to determine where (for example) a system resonance might be, thus helping the analyst to avoid this when balancing.



The SmartBalancer

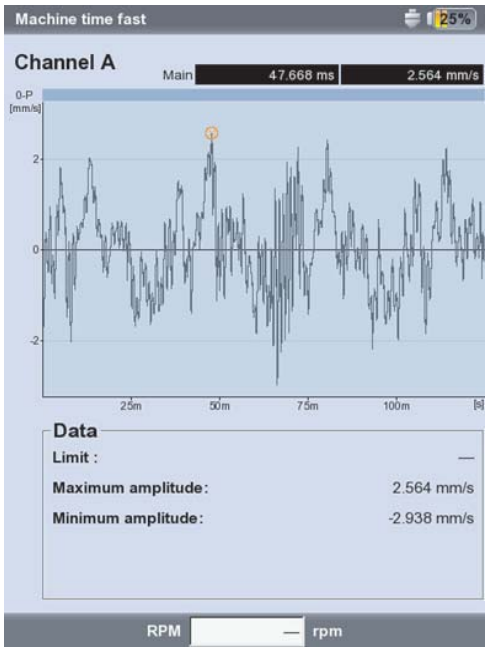
Successful Field Balancing (continued...)



The Bump Test allows the SmartBalancer also to determine the natural resonance frequencies of a structure via a simple impact. In the case of a rotating machine, this can be used to determine the speed ranges in which vibrations are increased disproportionately due to resonance, which can damage the machine. These ranges should then be avoided in operation, and passed through as quickly as possible when running up and coasting down. In principle, any vibration source is suitable for exciting a structure. A pulsed impact with a rubber hammer is one way.

The SmartBalancer will automatically trigger the measurement when the impact is sensed. It will average 4 separate measurements and gives the user the option to keep or discard each of the measurements used for to display the result.

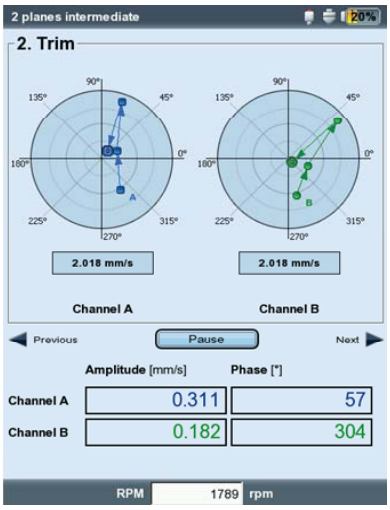
Time Waveform Function (Oscilloscope Function) provides an almost undamped, instantaneous response to the vibration signal.

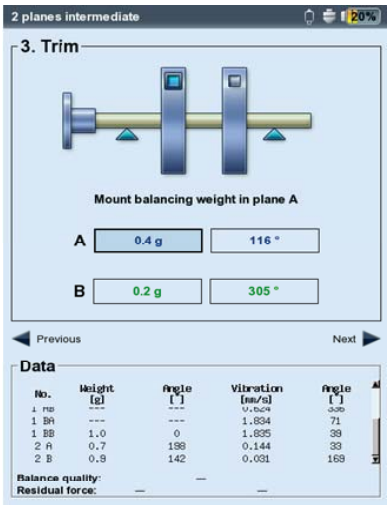


This makes it useful in the identification of transient, short duration form unstable and irregular vibrations caused by such things as mechanical looseness, transient impacts, etc. – they can negatively affect the outcome of a field balancing job. Oscilloscope functions are also useful for identifying sensor problems.

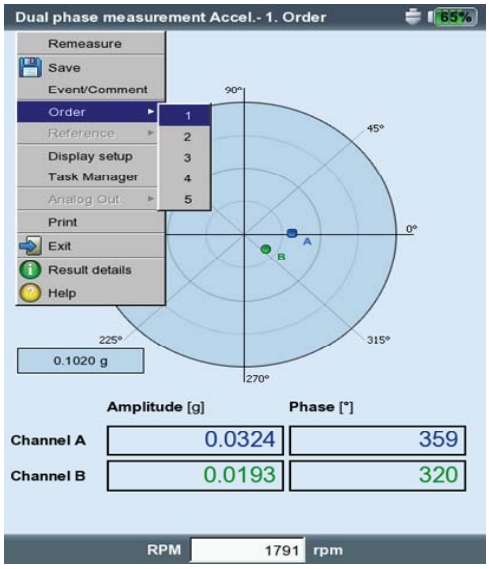
Balancing is an art that has come a long way from the days when vectors were plotted by hand on polar graph paper. Whether static (single plane) of dynamic (dual plane) balancing is needed, today's SmartBalancer provides the analyst with an array of powerful user friendly tools, all designed to get the job done as quick and efficient as possible.

- Dialogue-assisted operator guidance, vector display of the vibration values and direct printer output of balancing reports as well as archiving via PC
- Balancing speed: 100 to 60,000 rpm
- Number of correction planes: 1 or 2
- Summary of correction weights
  - Unbalance correction at fixed locations
  - Calculation of the angle position for 2 fixed weights
  - Measuring tape for exact determination of the position
  - Balancing quality to DIN ISO 1940





Phase measurement gives the user an advanced set of tools to distinguish machine faults. For example - it can be used to determine the unbalance type - static or dynamic, alignment errors, bent shaft detection, and/or loose foundation...This is a synchronous phase measurement, which means that the amplitude and the phase angle of the vibration sensor are calculated with respect to the laser pick-up.
In order to simplify the diagnosis, the measured signal is processed in an order filter. An unbalance for example, creates severe vibrations in the first order, whereas alignment errors predominately in the second order. The measurement can be carried out on one or two channels. In a two channel measurement, the phase difference in both planes are measured and can be used to determine the type of unbalance i.e. static, dynamic or coupled.



PC connectivity is a must for any instrument sold these days, whether for your own records or those of your customer, the ability to upload all recorded data to the PC is provided for you in the SmartBalancer. In addition the SmartBalancer provides an option to import the results into excel to further analyze the data. If the need to control the instrument remotely arises, the SmartBalancer features the capability to be controlled via a LAN connection.

Registered to Schenck

Schenck's new SmartBalancer is the latest in the line of the portable vibration analysis and field balancing instrumentation. For additional information on which instrument is that best suits your needs, contact us at 1-800-TREBEL-2 or visit our website: http://www.schenck-usa.com

Tooldyne

The complete package for balancing tools

The Tooldyne is a complete system for balancing tools and tool adaptors. You only require the correct tool adaptor and can then start balancing your tools directly. The machine is designed to measure in one and two planes so that it is capable of balancing different tool geometries perfectly. The pneumatic clamping mechanism pulls the tool into the tool adaptor in order to reproduce the operating conditions and thus ensures a reproducible tool set.

Technical Data

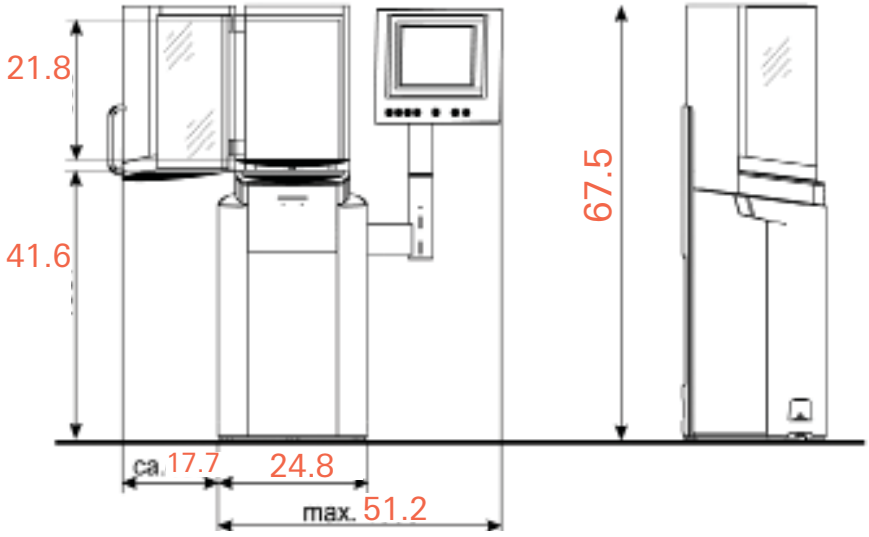
Rotor Dimensions

- Maximum rotor weight: 66lbs.
- Max. tool diameter: 15.7 inches
- Max. tool length inc. adaptor: 23.6 inches
- Spindle speed: 1200 rpm
- Minimum achievable residual unbalance: 0.5g/kg

Machine data

- Dimensions (see drawing - measurements in inches)
- Total weight: 1474 lbs. main connection: 220V +/-10%, 50 / 60 Hz
- Compressed air: 6 Bar
- Drive performance: 0.5hp
- Protective cover acc: ISO 7475 Class C (protection against ejected parts)
- 2 color paint RAL 7035 (light grey) RAK 70224 (graphite grey)

Measuring Unit Accessories
- With touch screen
- Printer for protocol print-outs
- Typical tool adapters e.g. for SK, HSK, BT, CAPTO



Your safety comes first

The Tooldyne fulfils the requirements laid down in the latest Machinery Directive 2006/42/EC, valid since the beginning of 2010, in every respect, and is CE certified. The protective cap fulfils the standards set by the ISO 7475 Class C - protection against ejected parts.

We have also ensured that many other components are safe in that they cannot clamp fingers and that adjustments can be carried out almost entirely without tools. The function of each component is safe and easy to understand.

Tooldyne mineral casting housing

Features that have proven highly successful on other balancing machines have also been used on our new Tooldyne. One example of this is the use of mineral casting for the machine housing. This modern material, which you may already use for the machine bed on your machine center - damps vibrations up to 10 times more effectively than grey cast iron and is therefore perfectly suited for use on a balancing machine. The Tooldyne is therefore substantially less sensitive against interfering with outside influences.

Mineral Casting also permits a crane hook machine design. Simply set it up, align it and connect it to compressed air and power supplies and you can start balancing your tools- all this without foundations and without having to bolt the machine to the floor.

Everything in its proper place

During the design of our new Tooldyne, ergonomics combined with easy operation were at the top of our specifications. The result of this - a compact solution in which everything is in its proper place: Starting with the easy to operate protective cover through to the ideal working height, right up to the easy accessible storage container for the tool adapter.

The measuring unit is clearly visible and allows you simple and direct input of all data via a touch screen. The logical operating concept with clear and easy understandable displays using symbols aligned to touch screen operation as well as a comprehensive range of operating aids will quickly make the Tooldyne a popular working device.

Today, high-speed machining is the established procedure for the economic machining of metals and plastics. Due to new developments in cutting materials and spindles, the achievable cutting speeds are consistently increasing. However, this procedure does have its challenges: Early in its development, it was recognized that the unbalance of spindles, specifically the tools, set severe limits on high-speed machining. This unbalance has a substantial influence on the achieved quality and precision of the surfaces to be machined. The spindle and tool longevity is also critically influenced by unbalance.

Whereas, the unbalance of spindles and other drive components can be removed during manufacturing, tools must be balanced more frequently, usually prior to initial use in a machine tool.

Schenck Trebel Community Relations

Provides Balancing Services and Support to Local High School: Sachem North Robotics Team

Schenck Trebel Corp. lends a helping hand and support to local High school students with their upcoming FIRST® (For Inspiration and Recognition of Science and Technology) Robotics Competition (FRC) endeavor at Hofstra University.

The Sachem North High School Team (named Sachem Aftershock, Team # 263) contacted STC to learn more about balancing and have some parts balanced for their robot so they can reduce vibration and energy consumption, as well as improve performance. The FRC (FIRST® Tech Challenge) competition for 2012 is the Rebound Rumble.

Schenck Trebel balanced the feed and output wheel sets that the team used for projecting the basketball towards the hoops. STC worked with the team leaders to determine the best way to make corrections to the wheels as well as determining a suitable balance tolerance.

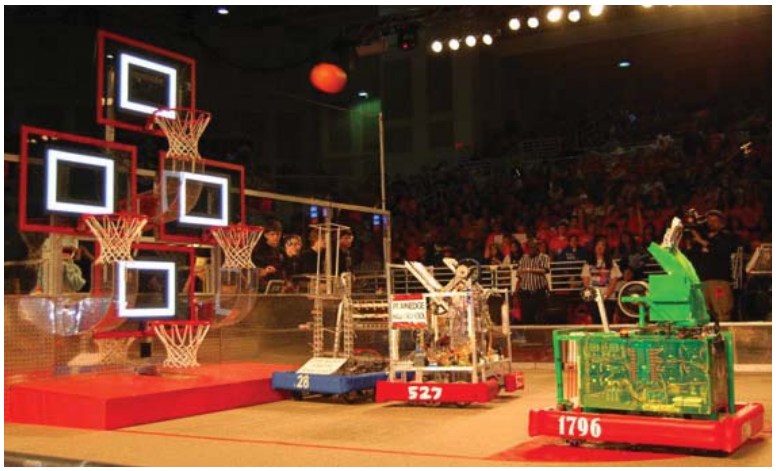
Game Overview:

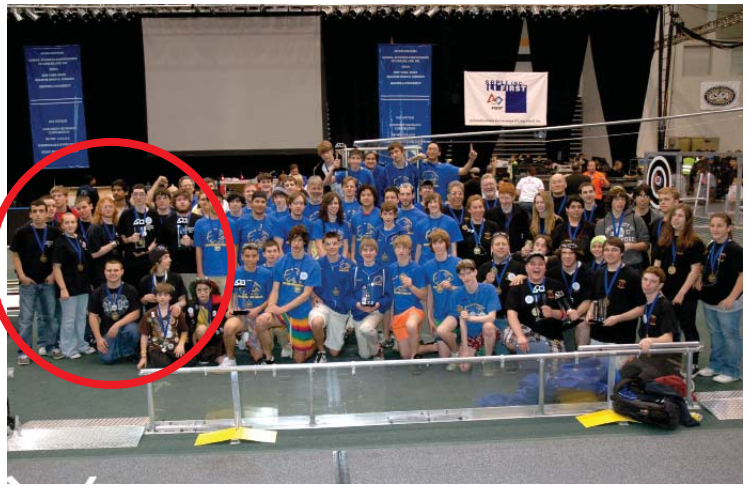
Rebound Rumble is played by two competing alliances on a flat, 27 x 54 ft. field. Each alliance consists of three robots. They compete to score as many basketballs into their hoops as they can during a 2 minute and 15 second match. The higher the hoop in which the basketball is scored, the more points the alliance receives.

Schenck Trebel is glad to be able to provide service and support for a local good cause in the name of advancing our youth's engineering and technology interests. The FRC promotes "co-opetition" principles in their program. Co-opetition describes a cooperative competition of teams, or organizations, where they cooperate with each other to reach a higher overall goal than what would have been achieved alone, without interaction, while at the same time competing in the same market / for the same prize. We hope that the service we provided as well as the knowledge gained by the Sachem team by working with STC provides good results for the team as well as future knowledge that can be used later in their careers.

Sachem Robotics AFTERSHOCK

REBOUND Rumble SM





Schenck Trebel Community Relations

The 4/6 Cylinder Enduro... 4 years later and more to come from Gang Green

Article by: Belinda Jenkins - Marketing and James Finlan – Technical Writer

I sat down for an interview with Jim Finlan, Technical Writer for Schenck Trebel. With a smile on his face and a twinkle in his eye, he began to tell me how Schenck's adventures at the 4/6 Cylinder Euduro at Riverhead Raceway started...
Team "Gang Green" began with just the 3 men - himself, his son - Gregory and Rick Wolf (Shop-worker for Schenck, a master auto body and restoration specialist). One day, just talking and fooling around, they were speaking about racing cars. After overhearing their conversation, (Charlie Anos - Schenck Materials and Product Control) told them he had a car and wanted to give it to them; and Rick specified Jim's son - Gregory was to drive it.

Team Gang green and the car building project was underway and the team was growing in members day by day – with mechanics, machinists, electricians, auto painters, and a junior mechanic in training - Jim's 3 year-old grandson, Dillan.

Jim said, "There was no need or want for "I" in this team. We all did it to have a good time... we were just having fun. Many people came out on the race track - team members and fans alike. A great time to be had by all. The camaraderie and feeling of all of us working together was nothing to be forgotten or measured. "

As year 3 approached Schenck CEO, Bertram Dittmar became a major player after over-hearing team members speaking about the color of the car for that year. Dittmar emerged saying: "What color will the car be?! It will be light grey and dark grey – the company colors!"...Dittmar (Schenck) had sponsored the team and the Enduro for a few years prior but he was reeled in - as a team member for life. Schenck's Marketing dept. - lead by Tarek El-Sawaf was also a pillar of support in keeping the project alive - aiding in vehicle and parts purchases, gas, signage and anything else that may have needed to be prepared for the next race.

From the archives - Team Gang Green - 2009

Schenck has taken a hiatus from racing for now, but we look forward to the day we build another race car (with OUR sticker on it) - soon to come. Stay tuned to see when "Gang Green" will race again.

Schenck Tradeshow and Seminar information

Visit us at any of our upcoming tradeshows to view our new products and sevices.

Schenck Trebel 2012 Trade Show Schedule		
Show	**Dates**	**Booth #**
WINDPOWER Atlanta, GA	June 3-6	7843
EASA Nashville, TN	June 24-26	418
IMTS Chicago, IL	September 10-15	E-5366
Turbo/Pump Symposium Houston, TX	September 25-27	1230
Powergen Orlando, FL	December 11-13	5609

Do You Need Seminar Information?

For information on Schenck trainings and seminars, Visit our web link at:
http://www.schenck-usa.com/serv_seminars.html.

If you are interested in attending a seminar or taking a Certification exam,
please contact Cari Semler
directly at 631-242-4010 ext. 219
and/or via email at: **cari.semler@schenck–usa.com**
for registration and hotel information.

You may also register for seminars via
our online registration form at:
http://www.schenck-usa.com/frm-serv_seminar?12.asp

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