Oerlikon Graziano – New product developments

Oerlikon Graziano strengthens its position in the high-tech gearing solutions

Rivoli (Torino – Italy), October 21, 2009 – Oerlikon Graziano is worldwide leader in the field of precision gearing and transmission solutions with more than 50 years of experience. To face the requirements of its Customers to improve the efficiency and performance of their vehicles, Oerlikon Graziano is without doubt at the cutting edge of this technology and recently announced and patented a number of innovative transmission solutions that not only improve vehicle performance but also help deliver significant improvements in fuel efficiency and costs.

The recognised contribution of Oerlikon Graziano in the transmission field is developing the next generation components and sub systems in the fields of synchronisation, integrated clutch design and the optimisation and manufacturing of high precision gears and shafts as well its new innovative CVT® Transmission. Its therefore Oerlikon Graziano intention to present these latest new product developments at the Agritechnica from 08 to 14 November 2009 in Hall 6 Stand K14.

The environmental challenge is simple greater efficiency, using less fuel.

The fuel saving is becoming a worldwide challenge for all OEM’s in agricultural and off-highway vehicles market. The new machine target to be 20% to 30% more fuel efficient than the previous ones they replace.

To reach this target, we have cooperated with the major construction and agricultural manufactures to develop both the new innovative transmission and the next generation synchronised/powershift transmissions capable of this type of efficiency.

One major development of this is a new modular design double cone synchroniser ™ capable of meeting the new and more demanding transmission requirements.

In order to satisfy the customer’s requirements of almost infinity life we have conducted of accelerated life and fatigue testing of more than 1.000.000 cycles which is now recognised as an off highway industry record for which we are justifiably proud.
New long life synchronizer™ concept (fig. 1)

This design and development brief issued by OEM's customers was simple to develop a new generation of synchronisers capable of meeting the high number of shifts necessary to keep vehicle engine within its maximum efficiency parameters. A consequence of this required new synchronizer concepts of modular design, capable to give guarantee performance improvement, higher wear resistance and longer durability, faster shift change and improved all-round efficiency.

These characteristics are not only meeting but superseding all expectation requirements placed on us by our OEM customers, Oerlikon Graziano supplying synchroniser solutions today for the vehicles of tomorrow.

The new synchroniser design, comprises of a number of innovative changes

- New activation system overcomes existing limits in terms of pre-synchronization elements structural resistance, increasing endurance life up to 1,500,000 shifting cycles, which is about an order of magnitude higher that current standard synchronizer design.

- Introduction of thrust washer as anti friction element between clutch body ring and inner ring in double cone models. This solution has completely solved the issue of premature wear of inner ring face, which was one of the biggest limits in terms of synchronizer endurance life. Anti friction solution guarantees a total life up to 1,500,000 shifting cycles without performance degradation.

- Introduction of carbon material, which is able to provide quick oil evacuation from friction surface at the beginning of synchronization phase, thus giving high and constant dynamic friction coefficient and positive lock up. This allows higher relative speed to be synchronized and lower synchronization time, making this a suitable solution when high performances are requested.

This new synchronizer concept has worldwide importance and can be potentially applied in all current application where a synchronization phase is necessary and improvements are required.

New power shift clutch module (fig. 2)

The concept of a power shift transmission is well understood and adopted by most of the major agricultural and construction OEM's around the world, in simple terms the synchronisers are replaced with hydraulic powershift clutches which carry out the gear or range change without power or torque interruption,(From a drivers perspective an almost seamless gear change).
Oerlikon Graziano is the recognised market leader in the manufacture of power shift clutch modules, to customer specific or Oerlikon Graziano own design, due to our capability to use the very latest EB or Laser welding capability coupled with all current available gear finishing to meet the most demanding of quality expectations.

What may come as a surprise is that not only can Oerlikon Graziano manufacture these most complex of transmission components with almost apparent effortless ease, we can also design entire transmissions or power shift clutch assembles for customers including all necessary modulation, sequencing and transmission software.

Testimony to this is recently for a Global Agricultural manufacturer, we have designed, developed and assisted in the manufactured of a completely new innovative powershift transmission, comprising of a double clutch for the powershuttle function, a powershift module with three gear rangers (low, medium, and high) and a innovative PTO single clutch design with integrated safety brake function.

The attraction from the customers perspective was that this would replace the existing transmission which was of a very complex mechanical/power shift design. Field testing of the new concept over the old design reveal QUANTUM improvement in driver perceived shift quality and ease of use, improvement in overall vehicle efficiency plus greatly reduced service and warranty costs. This was brought about by Oerlikon Graziano ability to design and develop a more robust and simplistic transmission layout, but building on our expertise to lever our extensive design and manufacturing capabilities in clutch and transmission design for the benefits of our customer, end user and ultimately the environment.

All these innovations are cutting edge and only feasible and made possible thanks to our 25 years of experience, extensive R&D activities, a dedicated and well trained work force and a world renown engineering team able to offer the design support to obtain the best possible specific synchroniser and power clutch solutions.

All our innovative solutions were fully developed, tested and validated by Oerlikon Graziano in our purpose industry leading test facility which can perform all necessary associated tests (including high and low temperature validation, endurance and fatigue testing) on complete synchronizer, power clutch or complete vehicle transmissions.
New Innovative CVT® Transmission : Ease in driving and fuel efficiency. (fig. 3)

Developed in cooperation with CNH for a 40–50 HP compact tractor range, Oerlikon Graziano has introduced first in the Agricultural Machinery market a Chain Continuously Variable Transmission.

The heart of the system is the Chain Drive Variator made up of a steel chain running between two pulleys with variable diameters. Each pulley consists of a moveable disc and a fixed disc with inclined surfaces. The discs can be drawn closer or moved apart to vary their real diameters and generate an infinite number of transmission ratios. Pressure clamping chain pins is constantly modulated according to required torque, in order to minimize power losses.

Epicyclical gear set, used to summarize output variable speed from variator with fixed ratio speed from engine, widen range of wheel speed from 0.3 to 30 Km/h, covering all the typical working and travel range for compact agricultural tractors.

The transmission of power is smooth and continuous from high to low ratios, with no shocks or starts.

Fully mechanical, this system offers the smoothness and continuous variation of a hydrostatic transmission, while providing the steady behaviour of a mechanical gearbox: the efficiency is 25% higher than a hydrostatic transmission, with important reduction of fuel consumption and a quieter operation.

All these features awarded to the Chain Continuously Variable Transmission the Silver medal at the 2009 Sima Innovation Award.

This innovative transmission is equipped with sensors to measure torque, engine speed and variator speed to control the transmission electronically, allowing for instance to set a constant working speed (while engine adapts to the load) or a constant engine speed (while transmission adapts ratio to the load)

Oerlikon Graziano the acknowledged industry leader in transmission design and manufacture.

HIGH-TECH AND INNOVATION PRODUCT PRESENTATIONS:
JOIN US AT OUR STAND K14 – HALL 6
ON 9TH AND 10TH NOVEMBER AT 10:30 OR 15:00
About Oerlikon

Oerlikon (SIX: OERL) is one of the world’s leading international high-tech industrial groups specializing in machine and plant engineering. The company is a leader in the field of industrial solutions and innovative technologies for textile manufacture, thin-film solar and thin-film coating, drive, precision and vacuum systems. With roots in Switzerland and a long tradition stretching back 100 years, Oerlikon is a global player with a workforce of almost 18 000 at 180 locations in 37 different countries. The company’s sales amounted to CHF 4.8 billion in 2008 and it ranks either first or second in the respective global markets.

About Oerlikon Graziano

Oerlikon Graziano is a global player in power transmission field with more than 80 years of experience. Today the company is focused on the major markets as Automotive, Off-Highway and Industrial Applications as well as in the zero emission field. Through its global footprint - in America (USA), Asia (China and India) and Europe (Italy, Czech Republic, Russia and UK) – and its innovation and high-tech solutions, know-how and capabilities, Oerlikon Graziano is able to face the customer needs, providing complete driveline systems as well as single gearing components. The company’s sales amounted to Euro 536 Mio in 2008 with a workforce of nearly 3.300 worldwide.

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(Fig. 1) - New synchroniser™ generation

(Fig. 2) - New powershift clutch module

(Fig. 3) - New Innovative CVT® Transmission