

## Eurotrans Gear Training 2010

### *A complete Gear Training Programme on Master Level (English spoken)*

*Although the Power Transmission Engineering industry is an important industry branch, universities fail to develop appropriate courses. In Europe, a mechanical engineer gets on average 5 hours of gear training. This is far too less to be effective in industry. Moreover, gear trainers are becoming rare due to retirement and non replacement. Therefore, Eurotrans identified the remaining top gear trainers and developed an extensive modular Gear Training covering all aspects from geometry and design over production to quality control and failure analysis. Addressing a European audience, this residential training is organised in several locations in close connection with famous gear laboratory.*

*Week 1: Geometry and design*

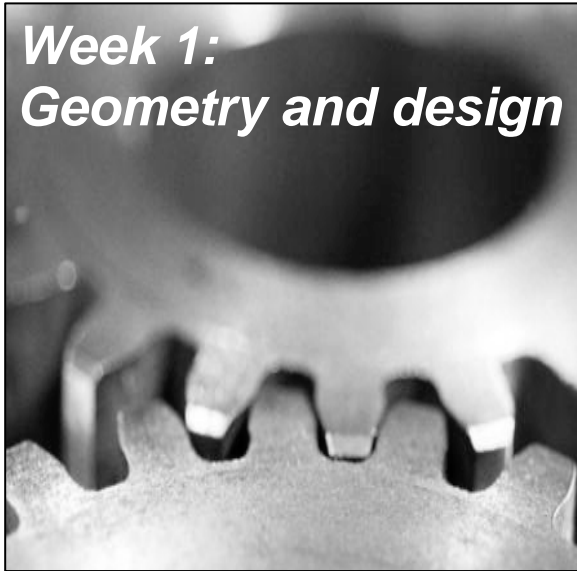
*Week 2: Production*

*Week 3: Quality and failure*

*Week 4: Advanced design, will be announced later*

*Please find the detailed programme for each week below. If you wish to subscribe, please use the subscription form at the end of this folder. Room reservations should be made directly with the hotel using the separate reservation form to take advantage of the special Eurotrans rates.*

# Week 1: Geometry and design



**When?** 18 – 22 January 2010  
**Where?** Senlis, France (CETIM)

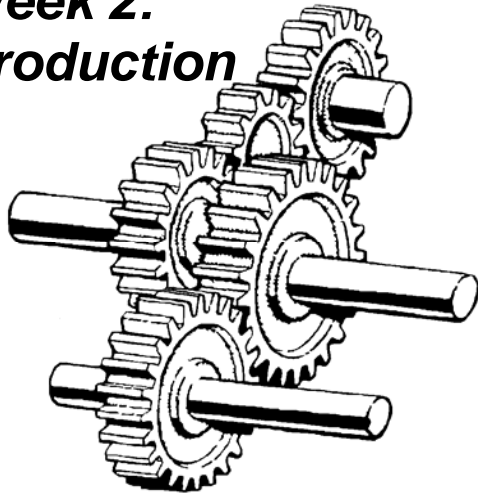


**Accommodation?** Rooms are available at the **IBIS** hotel in Senlis. Please confirm your room reservation directly to the hotel preferably one month before the start of the course. Hotel information is included at the end of this folder. Accommodation is **not** included in the price!

**Social programme?** The training package **includes** evening dinners and social activities such as a guided walk through the old city centre of Senlis, a visit to Chantilly and a visit of the 'Pavillon the Manse'. The social programme can be subject to change.

Monday AM		Travel		
Monday PM	INTRODUCTION	Introduction to Gearing	Why gears, short history, applications, types. General kinematics and dynamics, survey of Standards (ISO etc).	Bourgeois Jacquet (CETIM)
Monday PM	GEAR GEOMETRY	Geometry of involute gearing	Spur and helical gears, data relevant for gear rating and manufacturing: basic & rolling circles, pressure angles, helical angels, addendum modification, root and tip profiles & corrections, undercutting, specific gliding etc.	Bourgeois Jacquet (CETIM)
Tuesday AM	GEAR GEOMETRY	Geometry of involute gearing	Spur and helical gears, data relevant for gear rating and manufacturing: basic & rolling circles, pressure angles, helical angels, addendum modification, root and tip profiles & corrections, undercutting, specific gliding etc.	Bourgeois Jacquet (CETIM)
Tuesday PM	GEAR GEOMETRY	Variant gear Systems	Additional module covering other gear geometries: spiral bevel, planetary/internal gears, face gears, gear racks.	Bourgeois Jacquet (CETIM)
Wednesday AM	GEAR SPECS & DRAWINGS	Gear specifications	Data-sheets and drawings for gears and transmissions, relevant for design, manufacturing and measurement (incl. survey of quality standards and tolerances).	Michel Octrue (CETIM)
Wednesday AM	RATING OF GEARING	Gear rating Practice	Solicitations of gears – Introduction to Gear rating calculation for root strength, pitting, scuffing	Michel Octrue (CETIM)
Wednesday PM	RATING OF GEARING	Gear rating Practice	Gear rating calculation for root strength, pitting. Definitions, standards – ISO 6336 -, evaluation. (with examples).	Michel Octrue (CETIM)
Thursday AM	MATERIAL of GEAR BODY	Design of gear Body	Selection of gear material and appropriate shape of the body: impact on rating, production, cost...	Michel Octrue (CETIM)
Thursday PM	RATING OF GEARING	Gear rating Standards	Gear rating calculation for root strength, pitting. Definitions, standards – ISO 6336 -, evaluation. (with examples).	Michel Octrue (CETIM)
Friday AM	RATING OF GEARING	Gear rating Practice	Applications of standards.	Michel Octrue (CETIM)
Friday PM		Travel		

## Week 2: Production



**When?** 8 – 12 March 2010

**Where?** Namur, Belgium

**Accommodation?** Rooms are available at the **Leonardo** hotel in Wépion (Namur). Please confirm your room reservation directly to the hotel preferably one month before the start of the course. Hotel information is included at the end of this folder. Accommodation is **not** included in the price!

**Social programme?** The training package **includes** evening dinners and social activities such as a guided walk through the old city centre of Namur, a visit to the foie gras farm of Upignac and a bowling event. The social programme can be subject to change.

Monday AM		Travel		
Monday PM	INTRODUCTION		Gear Basics	Dr. Türich (Gleason)
Monday PM	GEAR HOBGING		Gear Hobbing of small pitch applications - Technologies, Machines, Tools	Dr. Kobialka (Gleason)
Tuesday AM	GEAR SHAPING		Gear Shaping Chamfering & Deburring of gears Gear Shaving - Technologies, Machines, Tools	Dr. Kobialka Mr. Schäferling (Gleason)
Tuesday PM	GEAR HONING		Important Aspects of Premachining for Honing and Grinding Gear Honing Solution for modern Threaded Wheel Grinding Technology	Dr. Türich Mr. Schäferling (Gleason)
Wednesday AM	GEAR FINISHING		Decision Criteria for hard finishing processes Gear inspection Combined processes	Mr. Schäferling Mr. Deininger (Gleason)
Wednesday PM	GEAR FINISHING		Gear Hobbing of Large Module Gears Productivity Increase in Grinding of Large Module Gears	Dr. Kobialka Dr. Türich (Gleason)
Thursday AM	GEAR PRODUCTION		Other production technologies and discussion. Wrap-up and closing remarks	Tbd (Gleason)
Thursday PM	SURFACE TREATMENT	Surface hardening techniques	Gear (surface) hardening: methods, metallurgy, micro-structure, equipment, process, control: case hardening, nitriding, induction...	Guy Claus (Sirris)
Friday AM	SURFACE TREATMENT	Case hardening (detail)	In depth study of case hardening process: ovens, oil, harding profile (definition and measurement, standards), defects (overcarburising, oxydation...), process control, monitoring, optimal charge...	Guy Claus (Sirris)
Friday PM		Travel		

## Week 3: Quality and failure



**When?** 26 – 30 April 2010

**Where?** Newcastle, United Kingdom (Design Unit)

**Accommodation?** Rooms are available at the **Hilton Newcastle Gateshead Hotel** in Newcastle. Please confirm your room reservation directly to the hotel preferably one month before the start of the course. Hotel information is included at the end of this folder. Accommodation is **not** included in the price!

**Social programme?** The training package **includes** evening dinners and social activities such as a guided walk through the old city centre of Newcastle, a river cruise and a club night at 'Pitcher and Piano'. The social programme can be subject to change.

Monday AM	Travel			
Monday PM	MEASUREMENT	Gear quality	Gear tolerances: definitions, standards, evaluation with reference to the total gear quality.	Rob Frazer (DU)
Tuesday AM	MEASUREMENT	Gear quality	Gear tolerances: definitions, standards, evaluation with reference to the total gear quality.	Rob Frazer (DU)
Tuesday PM	MEASUREMENT	Measurement practice	Measurement methods, process, reporting, evaluation, interpretation, management of equipment, calibration...	Rob Frazer (DU)
Wednesday AM	MEASUREMENT	Interpretation of measurement graphics	Analyses of deviations of profiles, helix, pitch. Link with their origins	Rob Frazer (DU)
Wednesday PM	TRIBOLOGY	Tribology of gear mesh,	Oil film, friction coefficients, roughness, material, oil qualities and qualification, heat generation, efficiency...	Michel Octrue (CETIM)
Thursday AM	TRIBOLOGY	Lubrication systems in gear transmissions and coatings	Thermal rating and power losses - micropitting, scuffing for different applications in a range of speeds, sizes, shaft arrangements and environments...	Michel Octrue (CETIM)
Thursday PM	MAINTENANCE	Maintenance practice of gears	Good practice in maintenance of gear transmissions.	Michel Octrue (CETIM)
Friday AM	MAINTENANCE	Monitoring gear transmissions – Failure analysis	Monitoring gear performance in the field. Analysis of typical gear failures (incl. standards).	Michel Octrue (CETIM)
Friday PM	Travel			



**EUROTRANS GEAR TRAINING (CHECK THE WEEKS OF YOUR CHOICE)**

- WEEK 1 “GEOMETRY AND DESIGN”**  
Senlis (FR), 18 – 22 January 2010
- WEEK 2 “PRODUCTION”**  
Namur (BE), 8 – 12 March 2010
- WEEK 3 “QUALITY AND OPERATION”**  
Newcastle (UK), 26 – 30 April 2010

**INSCRIPTION FORM**

> Form to be returned at least **7 days before the start of the course** (or **30 days for early bookings**) to **Marleen Poelmans**, Diamant Building, bd A.Reyers ln 80, 1030 Brussels, by fax 02/706 79 66 or by e-mail to [marleen.poelmans@agoria.be](mailto:marleen.poelmans@agoria.be)

Mr./Mrs. ....

Function .....

Company .....

Address .....

E-mail .....

Tel. .... Fax. ....

VAT Nr .....

Participation fee for an **individual** week of training:

- 1500 EUR (vat excl.) per person for early bookings at least **30 days before** the start of the training
- 1600 EUR (vat excl.) per person for late bookings at least **7 days before** the start of the training
- 2000 EUR (vat excl.) per person for organisations non-member of EUROTRANS associations**

From the 2<sup>nd</sup> and consequent inscription from the same company a 100€ reduction will automatically be granted.

An invoice will be sent to you upon receipt of your registration from **Cetim** for week 1, from **Agoria** for week 2 and from **Design Unit** for week 3. Invoice address if different from the above:

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Cancellation conditions:

- > No charge if cancelled at least 30 days before the start of the course
- > For cancellations at least 7 days before the start of the course, 50% of the inscription fee will be refunded
- > No refund will be made for cancellations received after 7 days before the start of the course, however replacement of a registered person is possible
- > **In case of insufficient inscriptions the course will be cancelled and refunded**

Date and signature:



## EUROTRANS GEAR TRAINING

- ❑ **WEEK 1 “GEOMETRY AND DESIGN”**  
Senlis (FR), 18 – 22 January 2010
- ❑ **WEEK 2 “PRODUCTION”**  
Namur (BE), 8 – 12 March 2010
- ❑ **WEEK 3 “QUALITY AND OPERATION”**  
Newcastle (UK), 26 – 30 April 2010

## HOTEL INFORMATION

Please confirm your room reservation directly to the hotel preferably one month before the start of the course. To make use of the EUROTRANS negotiated rate, please mention the block booking code upon reservation. Accommodation is not included in the price!

We recommend the following hotels:

- ❑ **WEEK 1 “GEOMETRY AND DESIGN”**  
Senlis (FR), 18 – 22 January 2010

### Hôtel Ibis Senlis

Route Nationale 324 BP 74 / F – 60300 SENLIS  
Tel 00 33 (0)3 44 53 70 50 / Fax 00 33 (0)3 44 53 51 93  
Mail [h0709@accor.com](mailto:h0709@accor.com)  
[www.ibishotel.com](http://www.ibishotel.com)  
Block booking code: **meeting Eurotrans 2010**

Price indication single room: € 75 and € 8 breakfast

- ❑ **WEEK 2 “PRODUCTION”**  
Namur (BE), 8 – 12 March 2010

### Hotel Leonardo Namur

Chaussée de Dinant 1149 / B – 5100 WEPION  
Tel 00 32 (0)81 46 81 62 / Fax 00 32 (0)81 46 03 60  
Mail [d.jaumotte@leonardo-hotels.com](mailto:d.jaumotte@leonardo-hotels.com)  
[www.leonardo-hotels.com](http://www.leonardo-hotels.com)  
Block booking code: **meeting Agoria**

Price indication single room: € 79 breakfast included  
Price indication double/Twin room: € 89 breakfast included

- ❑ **WEEK 3 “QUALITY AND OPERATION”**  
Newcastle (UK), 26 – 30 April 2010

### The Hilton Newcastle Gateshead Hotel

Bottle Bank, Gateshead / UK – NEWCASTLE UPON TYNE NE8 2AR  
Tel 00 44 (0)191 490 9700 / Fax 00 44 (0)191 490 9800  
Contact: Wendy Louis Bryant, Reservations Manager (tel. 44-191-490-9707)  
Mail [reservations.newcastle@hilton.com](mailto:reservations.newcastle@hilton.com)  
[www.hilton.co.uk/newcastlegateshead](http://www.hilton.co.uk/newcastlegateshead)  
Block booking code: **GEGTA - Eurotrans Gear Training 2010 - Agoria/Newcastle University Design Unit**

Price indication single room: £ 110 breakfast included  
Price indication double/Twin room: £ 120 breakfast included