Unknown involute gear

IMT Expert Workshop
“GEAR"

Bangalore (India),
May 23rd - 26th, 2011

Wolfgang Haug

Agenda

1. Customer & Request
2. Work piece and Measurement task
3. Inspection Specials
4. Inspection Specials
5. Inspection Specials
6. Further Remarks

Work piece and Measurement Task

Who is the customer?

Any customer with unknown gear

What are the requirements of the customer?

Reverse engineering or old gears without data

Inspection Specials

Preparations:

Count and measure

1. **Number of teeth z**
2. **Tip and root diameter df da**
3. **Helix angle**

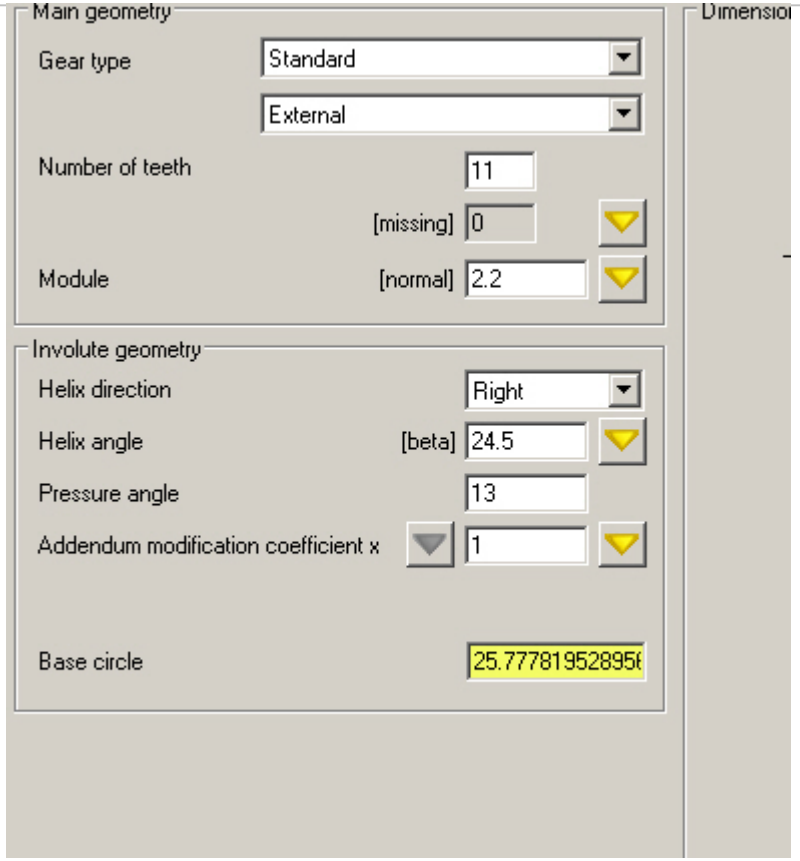
Calculate module by

(da + df) / 2 = d

d / z = m

Or measure pitch and m = p/Pi

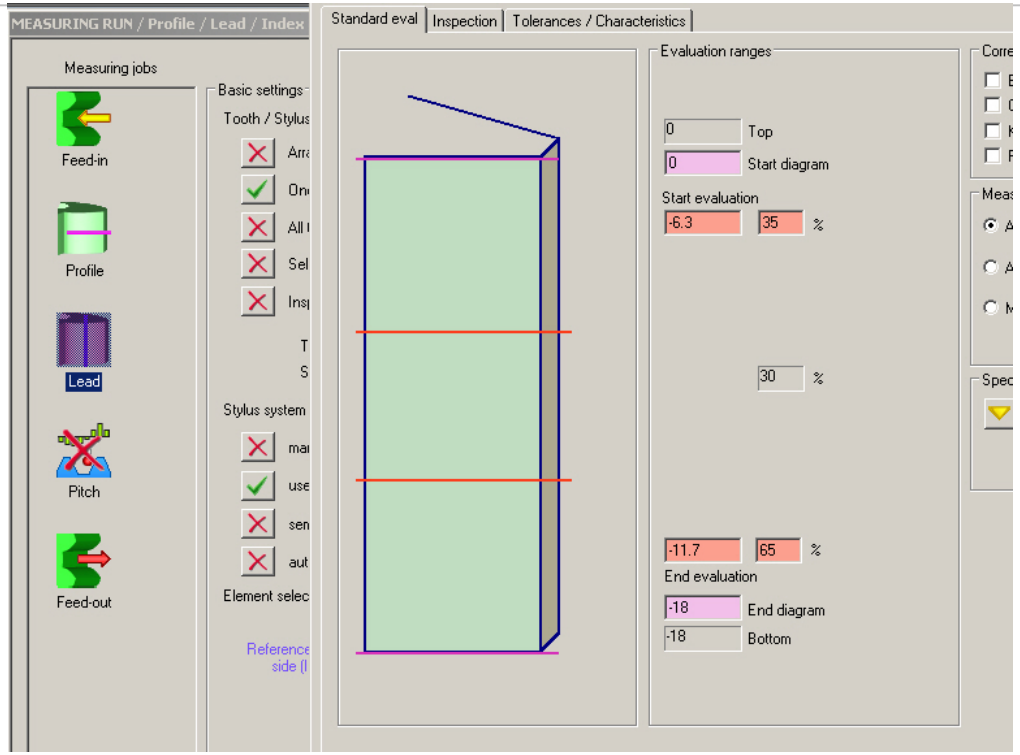
The changes of module, helix angle and pressure angle are valid for the geometery (base circle diameter)



Inspection Specials

Defining the measuring job:

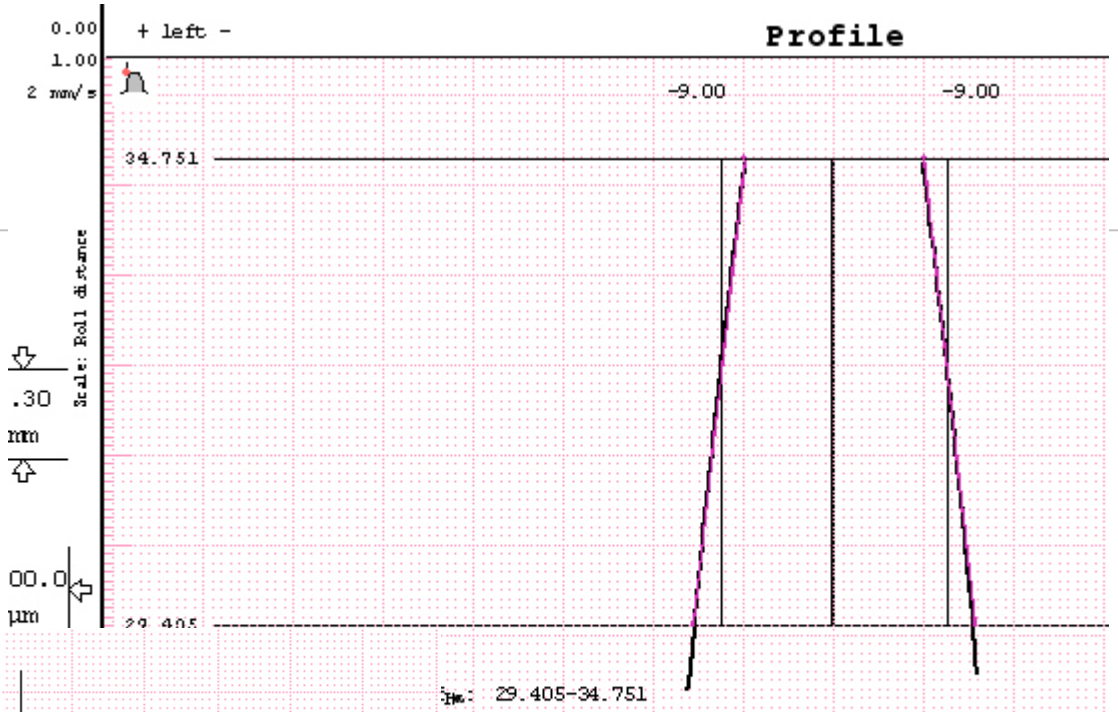
1. Feed in with tooth thickness correction, profile 1 tooth, lead 1 tooth and reduced lead measurement, no pitch measurement



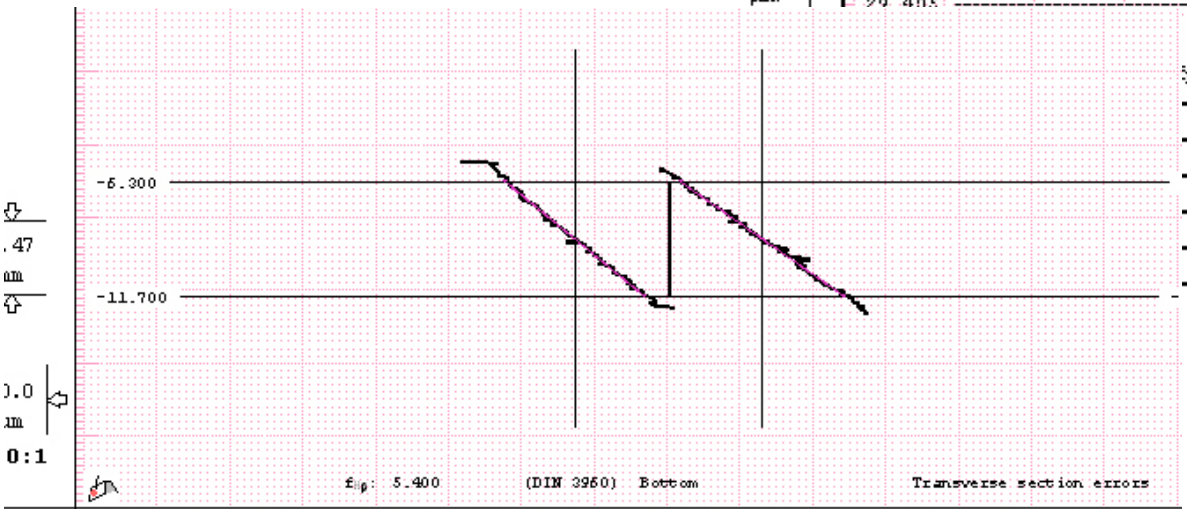
Inspection Specials

First attempt :

Profile error -570 µ on a diameter distance of 5.35 mm



	1	Qa	Qa	1
	560	>12	>12	554
	23	10	10	27
	-570	>12	>12	-567

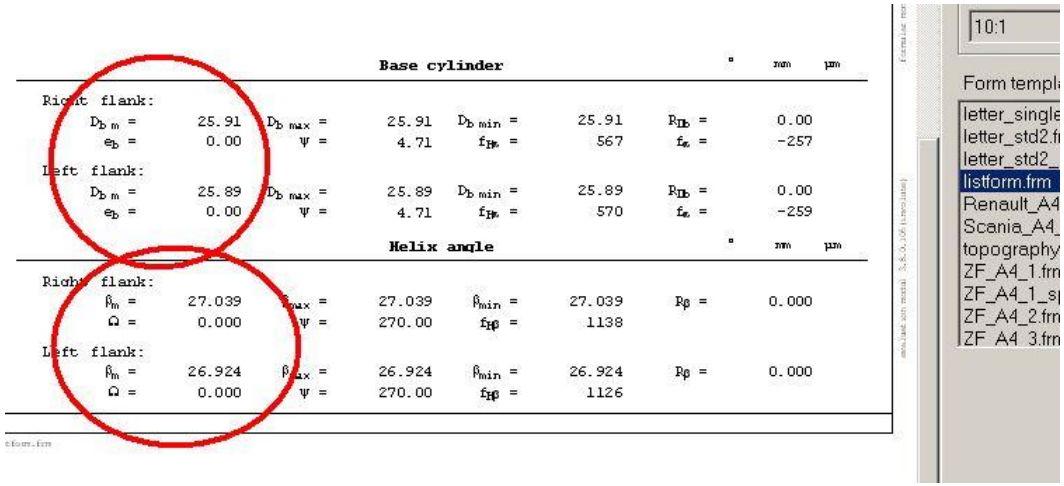


	Qn	[...]	1	Qa	Qa	1	Qn	[.
µm	6	9	75	12	12	90	6	
µm	6	6	9	9	10	15	6	
µm	6	±8	76	12	12	89	6	

Inspection Specials

For more information about helix angle and base circle you have to change to listform.frm

With later evaluation you can modify the gear data and see the result



Base cylinder

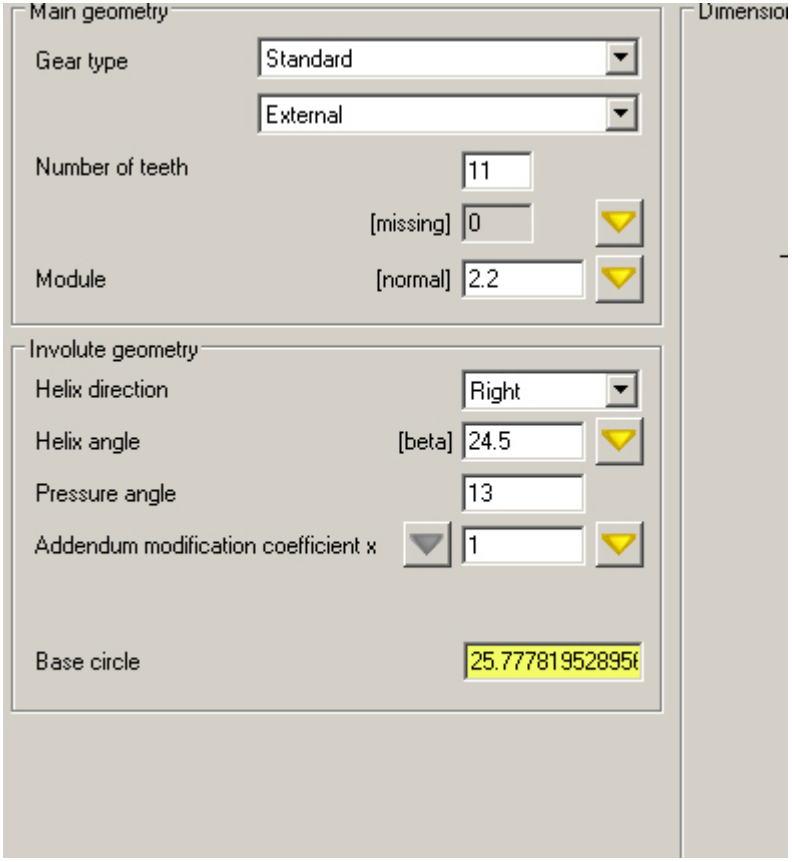
Right flank:									
$D_{b\,m}$ =	25.91	$D_{b\,max}$ =	25.91	$D_{b\,min}$ =	25.91	R_{Db} =	0.00		
e_b =	0.00	Ψ =	4.71	$f_{H\alpha}$ =	567	$f_{f\alpha}$ =	-257		
Left flank:									
$D_{b\,m}$ =	25.89	$D_{b\,max}$ =	25.89	$D_{b\,min}$ =	25.89	R_{Db} =	0.00		
e_b =	0.00	Ψ =	4.71	$f_{H\alpha}$ =	570	$f_{f\alpha}$ =	-259		

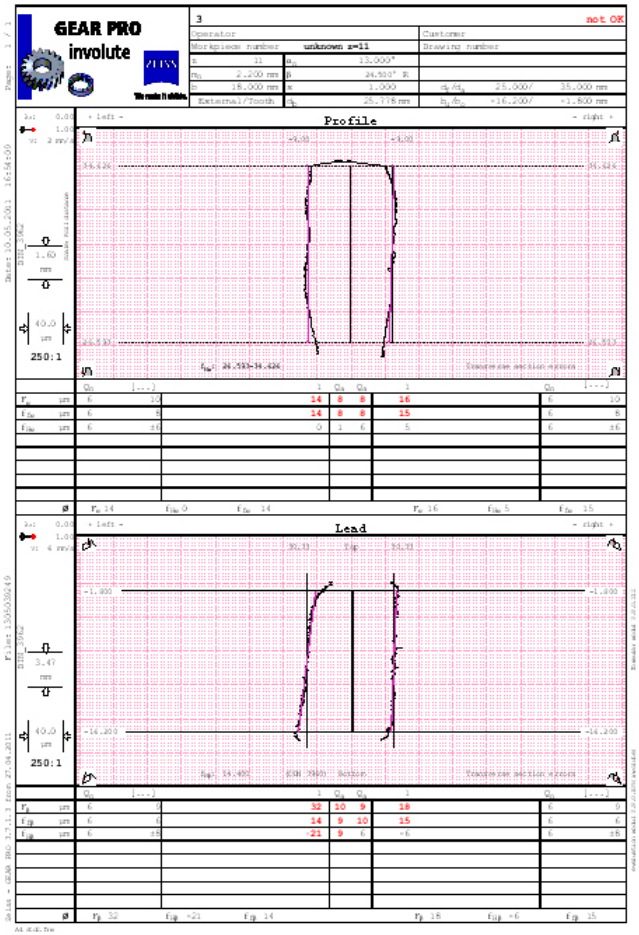
Helix angle

Right flank:									
β_m =	27.039	β_{max} =	27.039	β_{min} =	27.039	R_β =	0.000		
Ω =	0.000	Ψ =	270.00	$f_{H\beta}$ =	1138				
Left flank:									
β_m =	26.924	β_{max} =	26.924	β_{min} =	26.924	R_β =	0.000		
Ω =	0.000	Ψ =	270.00	$f_{H\beta}$ =	1126				

Inspection Specials

This is the output of the optimized unknown gear data



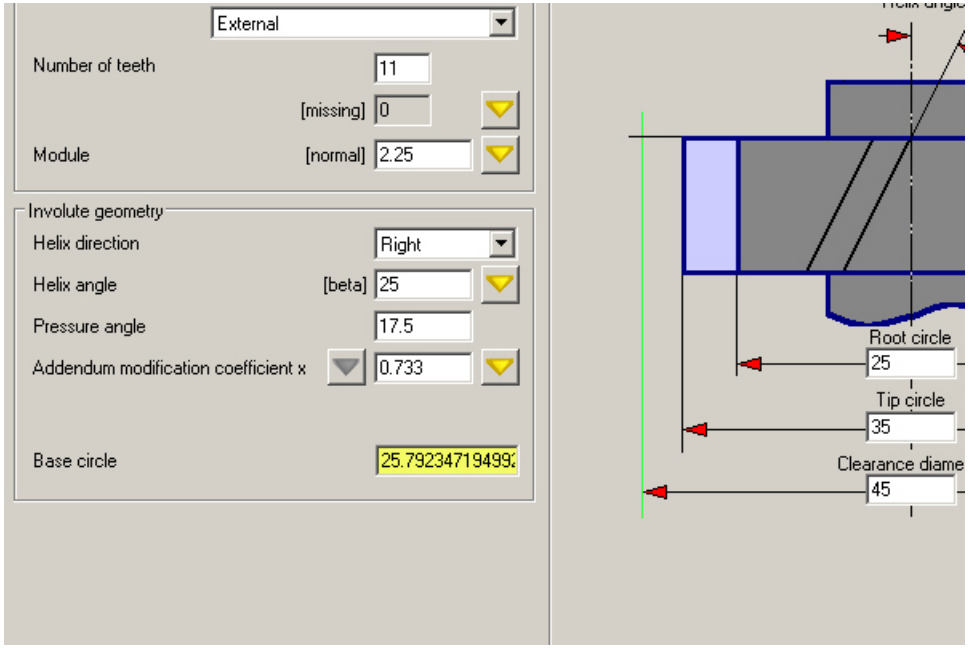


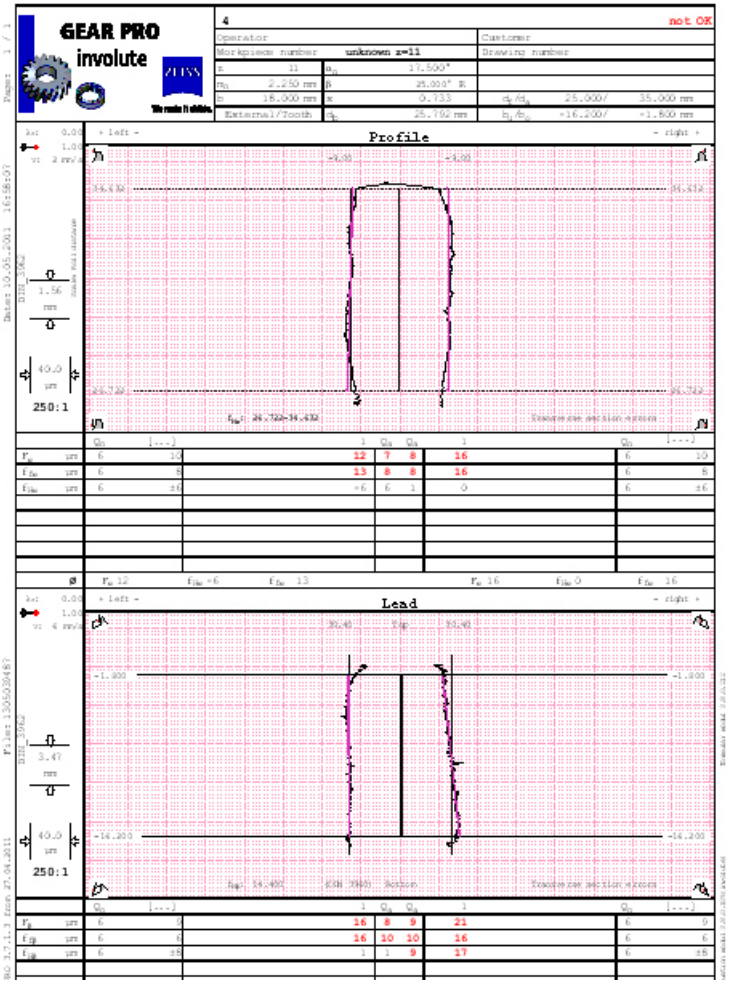
Inspection Specials

This is the output according the nominal gear data from drawing

You can see:

The data are not the same





Further Remarks

Anything else to remark?

We make it visible.