



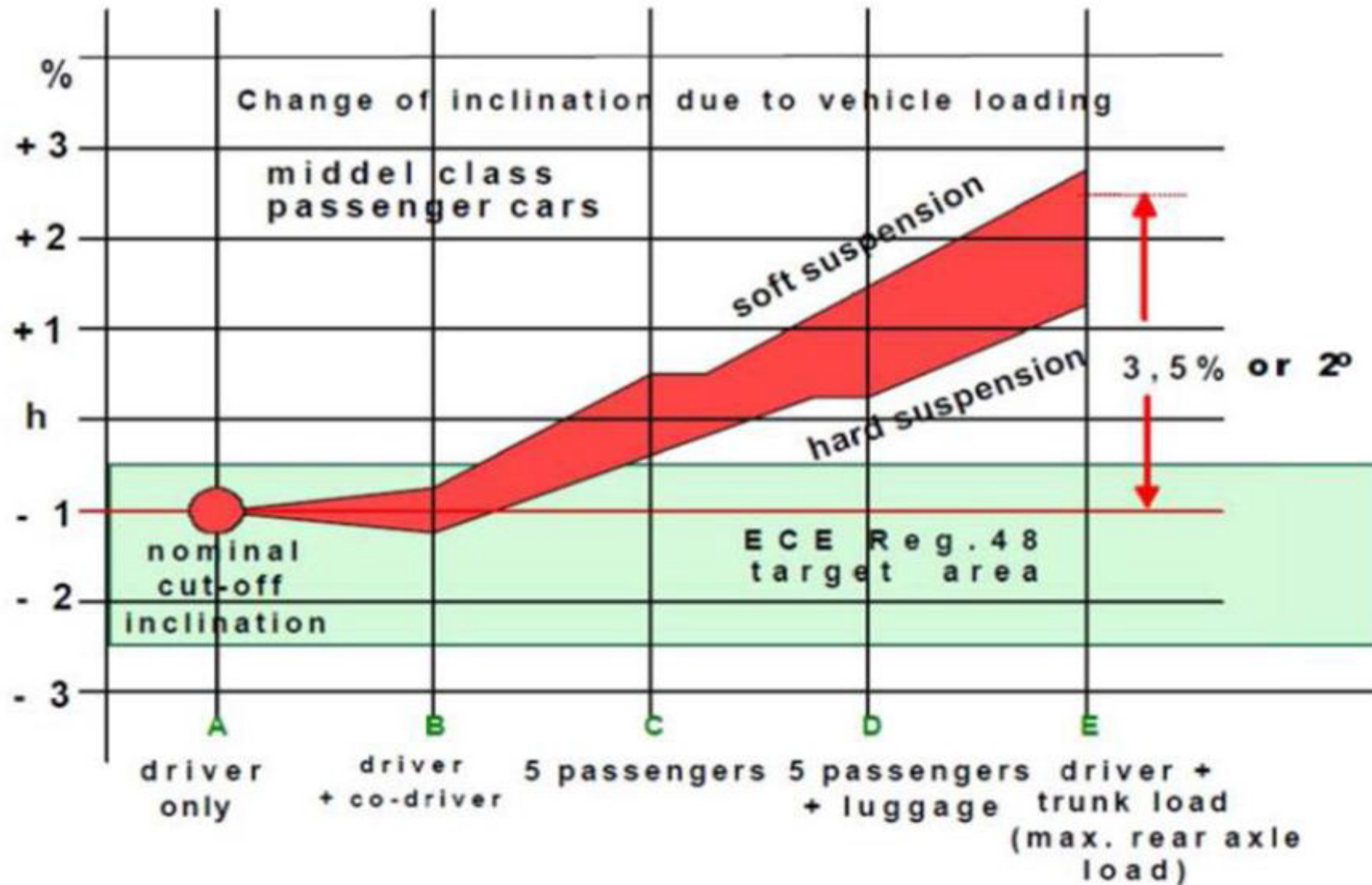
3rd IWG VGL, Paris 18-19 July 2016,

# Consolidated explanations of rules for none/manual/automatic levelling in GRE-73-18

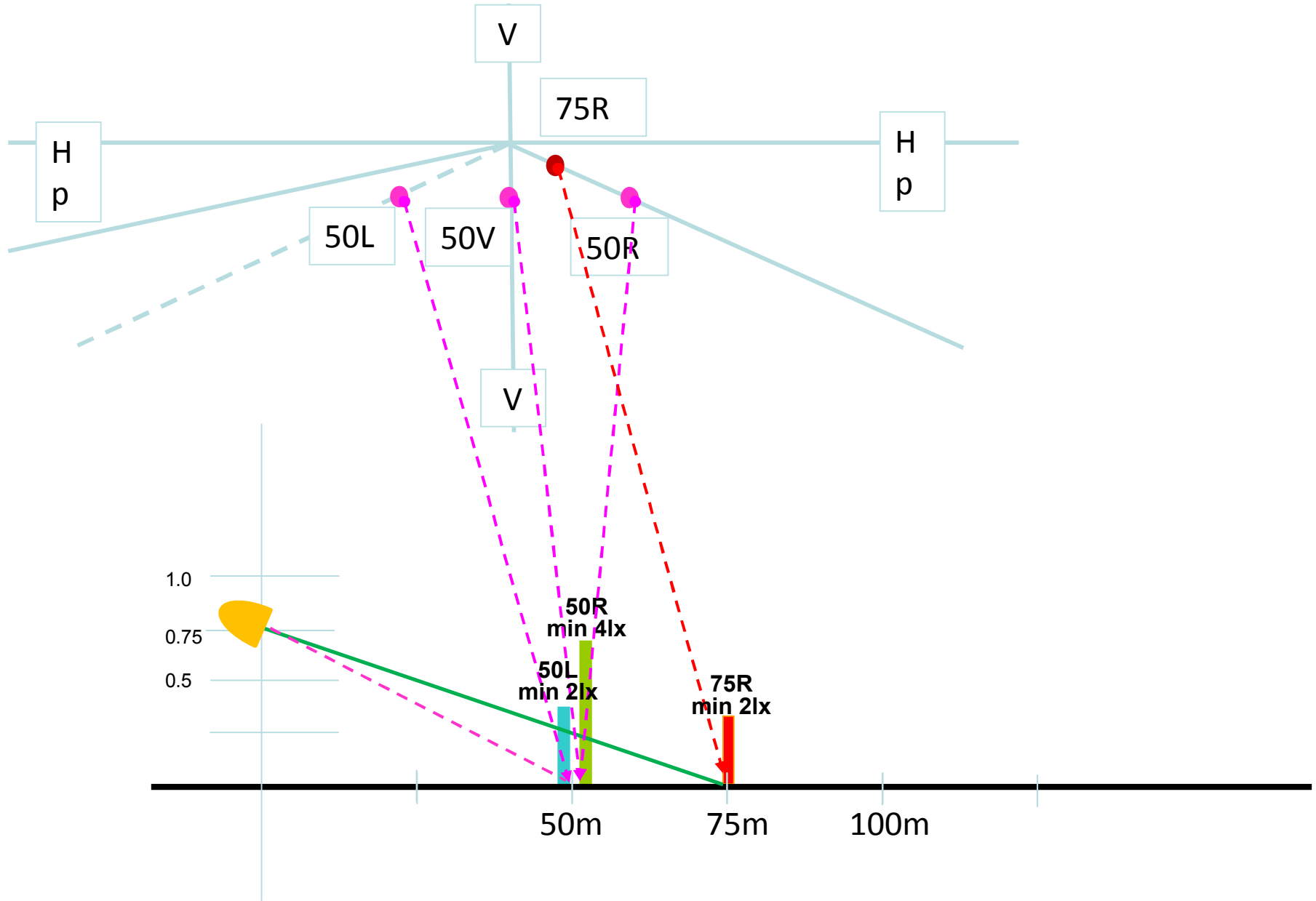
Tomasz Targosiński Ph. D. Eng  
Poland



# Hanno Westermann, History and Scientific Back-up

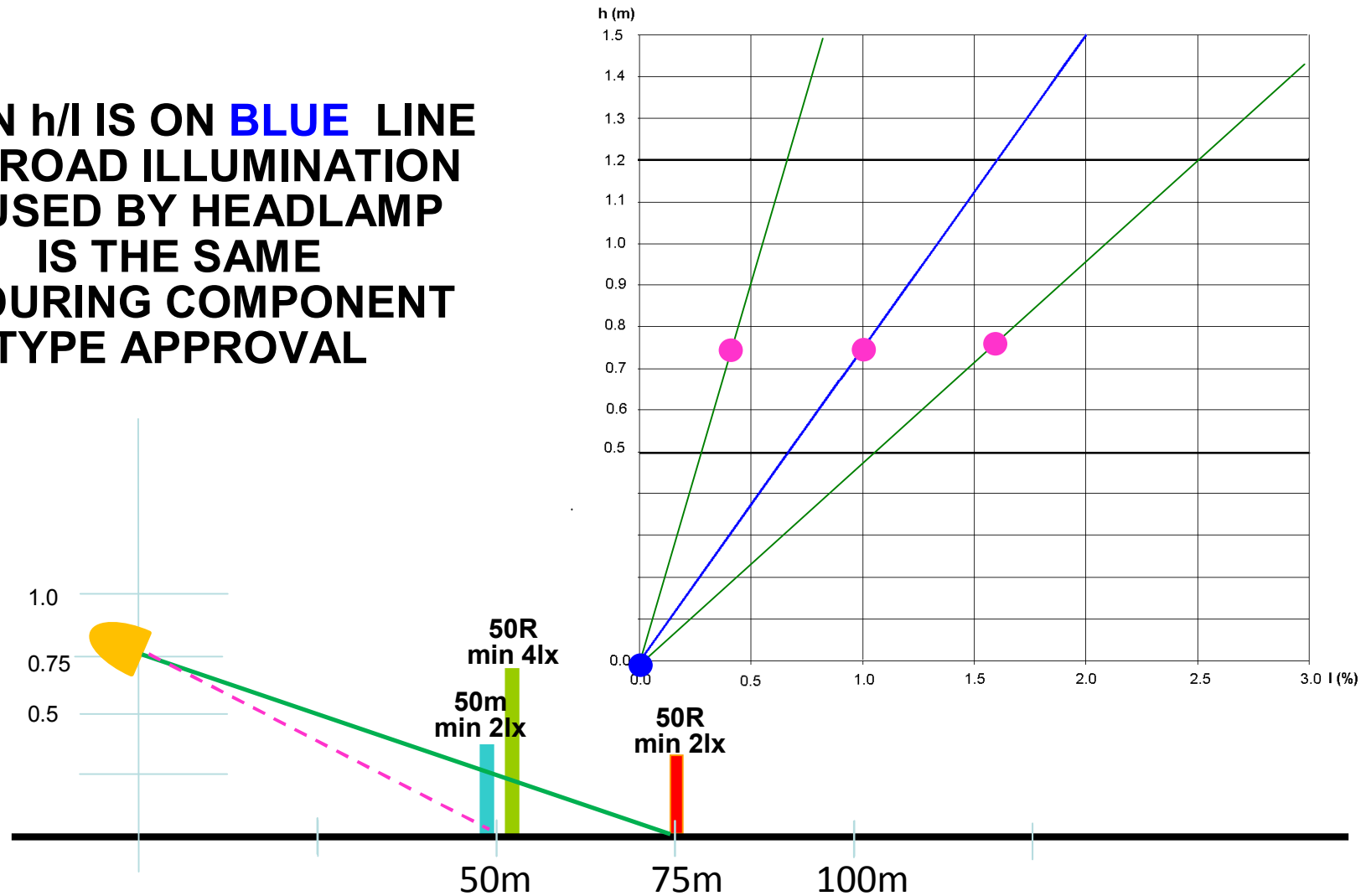


# GEOMETRICAL BASE FOR PROPOSAL h(eight) vs. I(nclination)



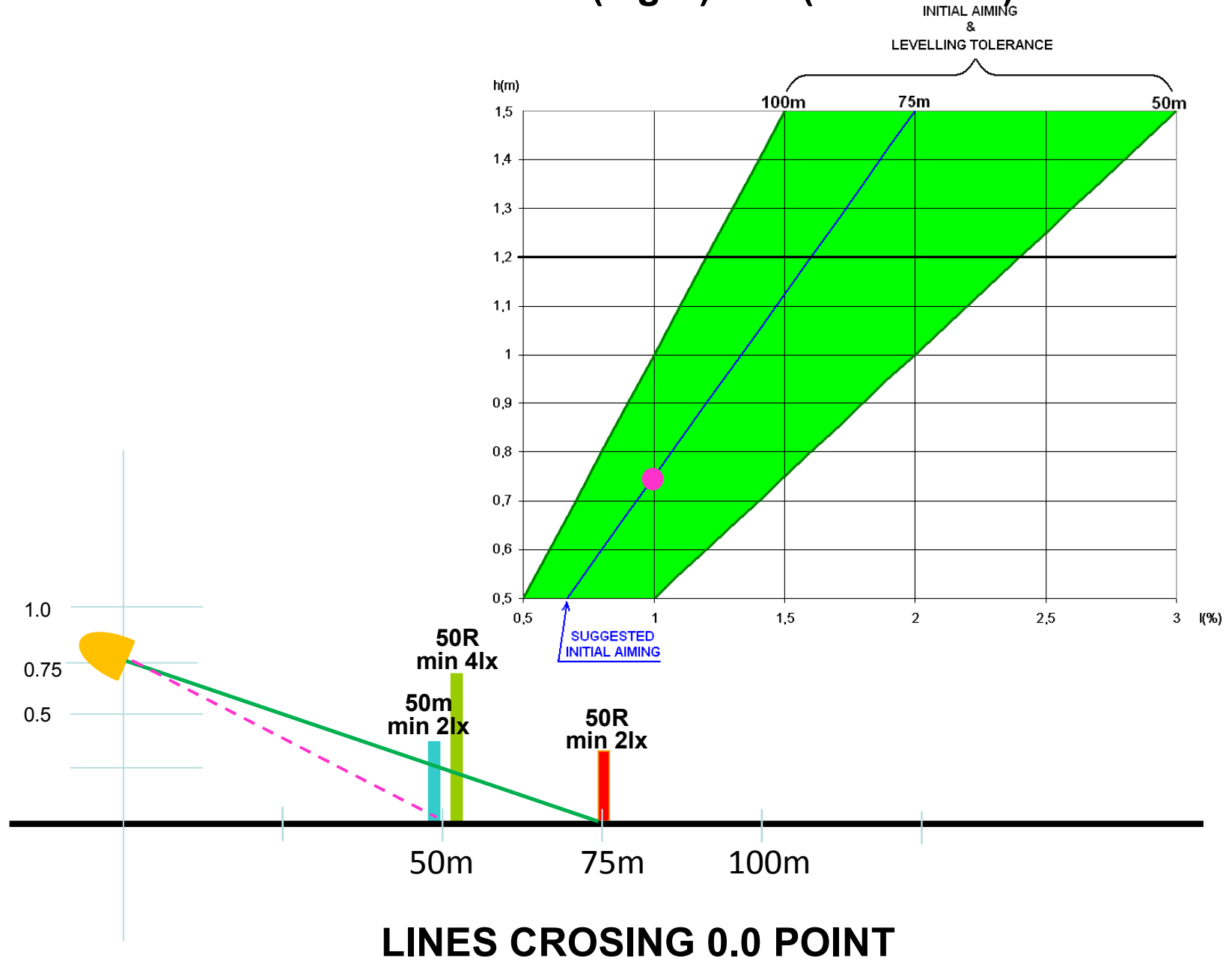
# GEOMETRICAL BASE FOR POLISH PROPOSAL h(eight) vs. I(nclination)

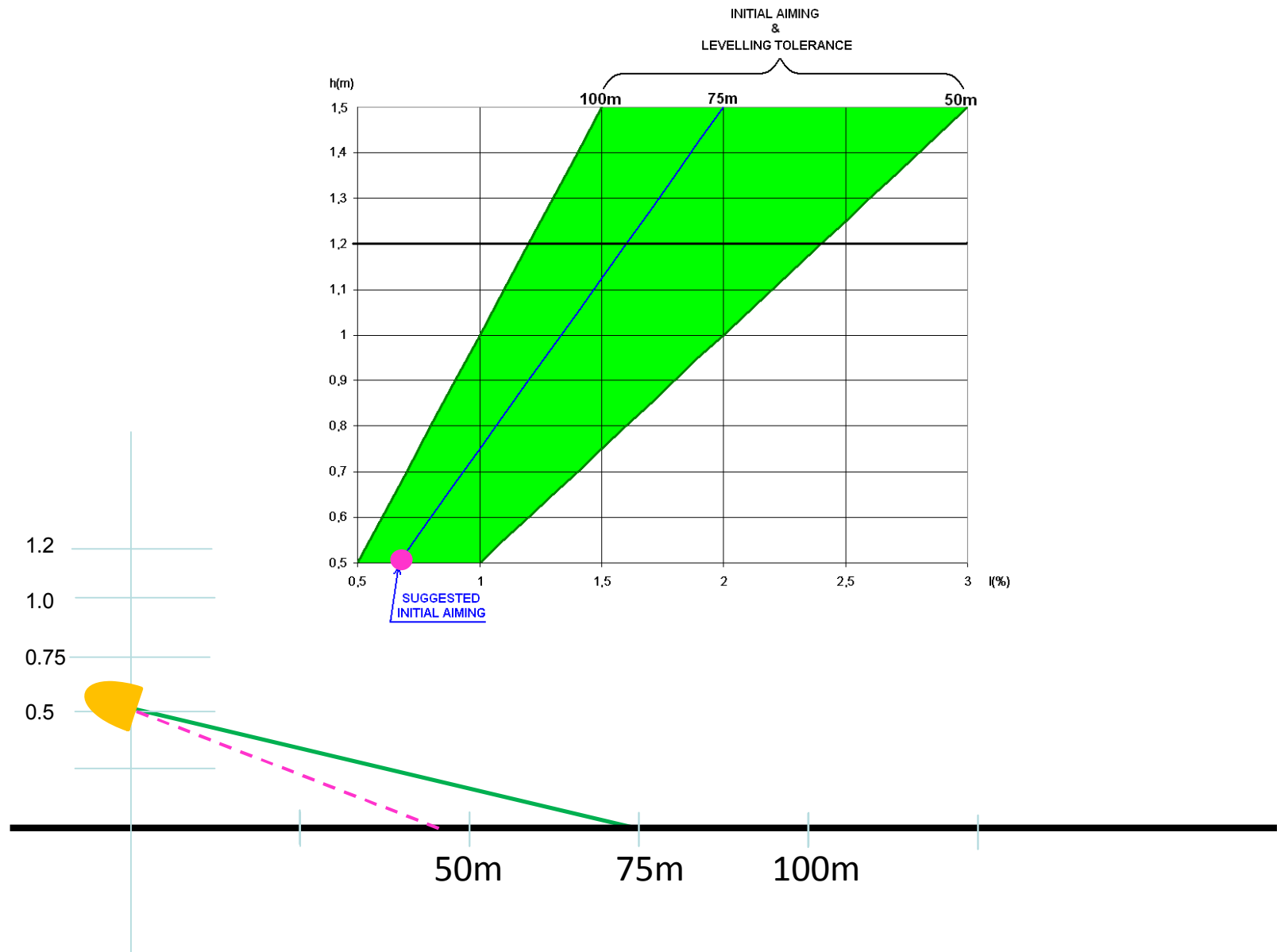
WHEN  $h/I$  IS ON **BLUE** LINE  
THE ROAD ILLUMINATION  
CAUSED BY HEADLAMP  
IS THE SAME  
AS DURING COMPONENT  
TYPE APPROVAL

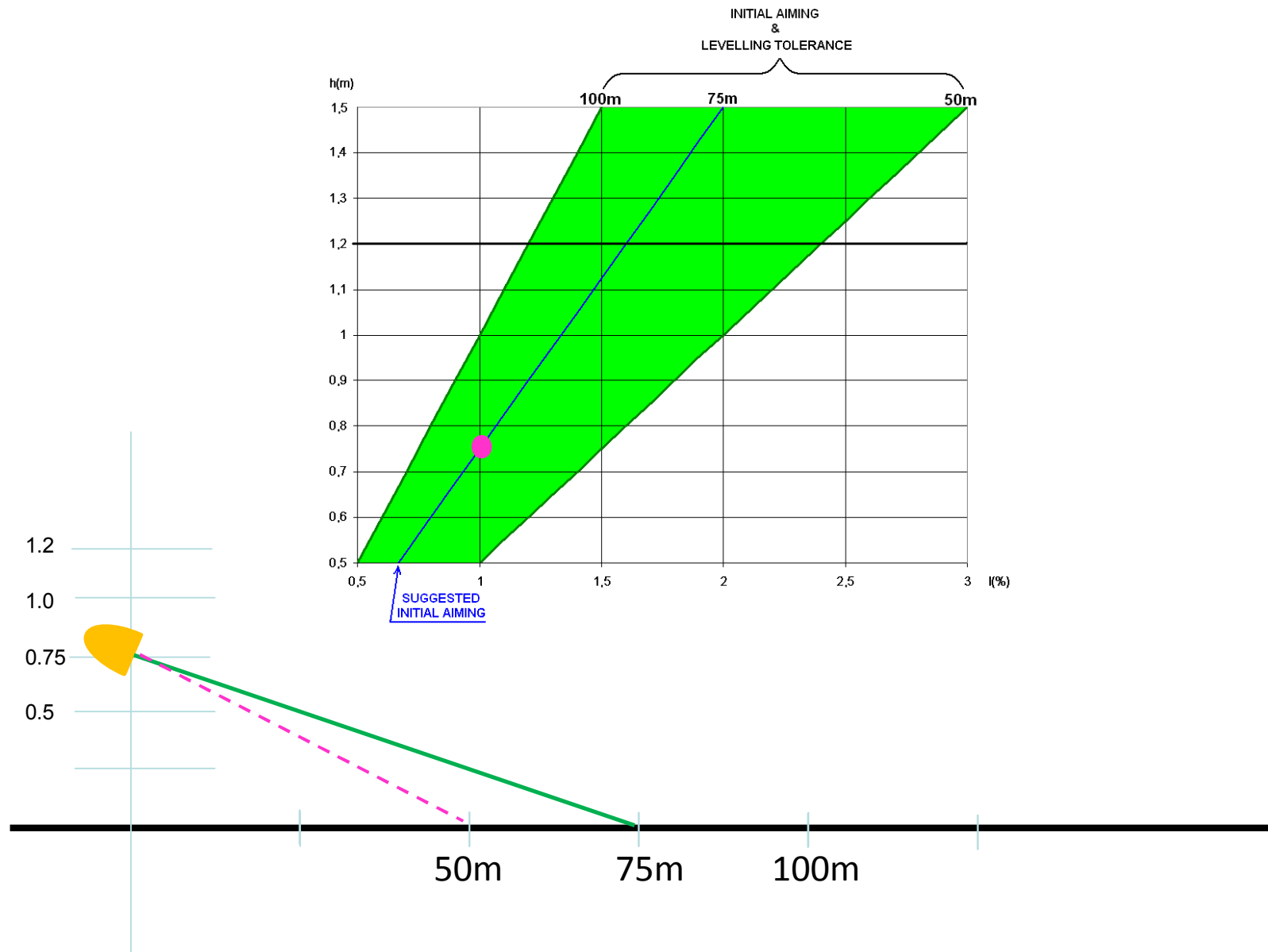


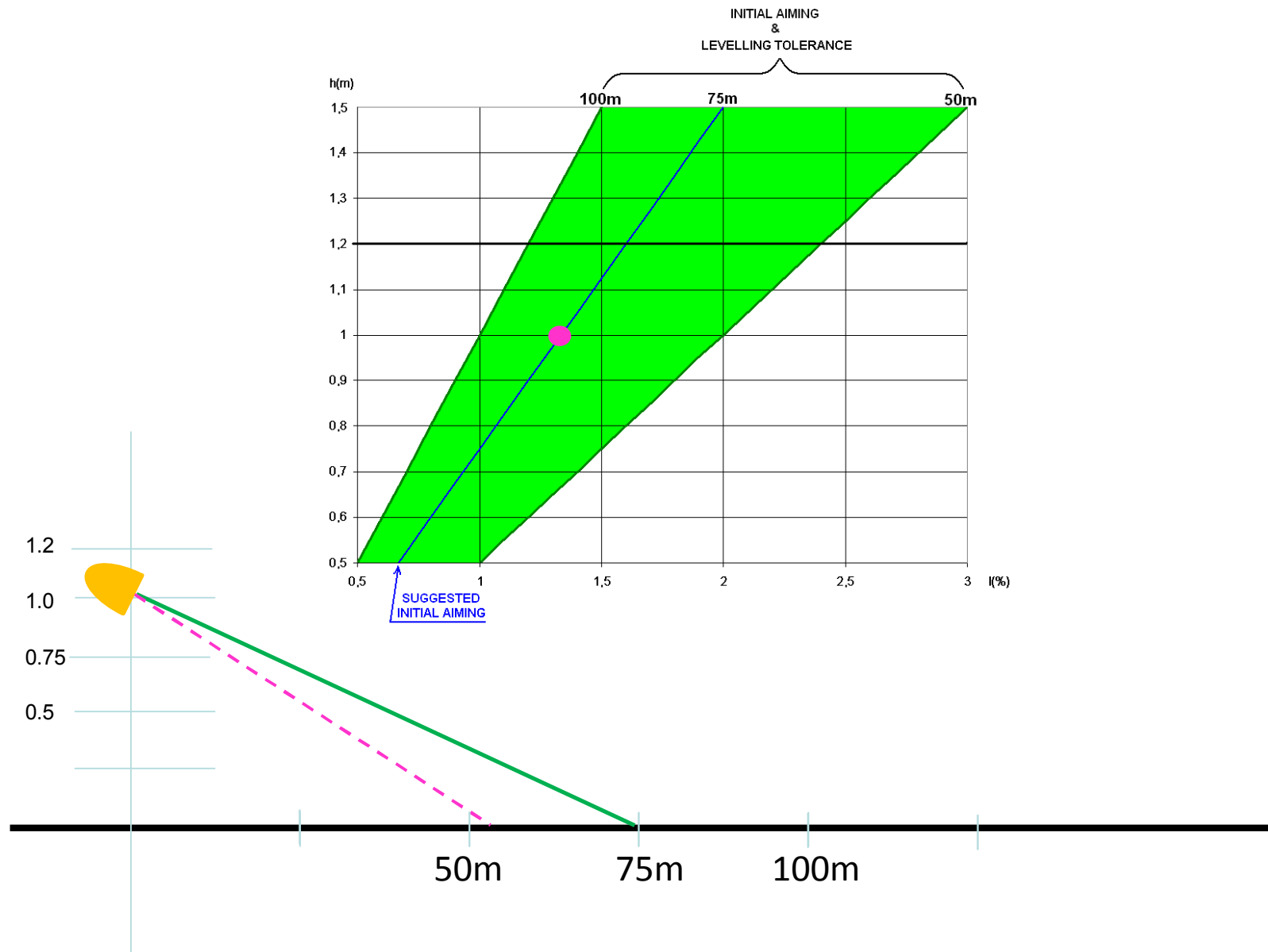
WHEN  $h/I$  IS ON ANOTHER **GREEN** LINE CROSSING **0.0** POINT THE ROAD  
ILLUMINATION IS THE SAME FOR ANY HEIGHT

# BASE FOR PROPOSAL h(eight) vs. I(nclination)

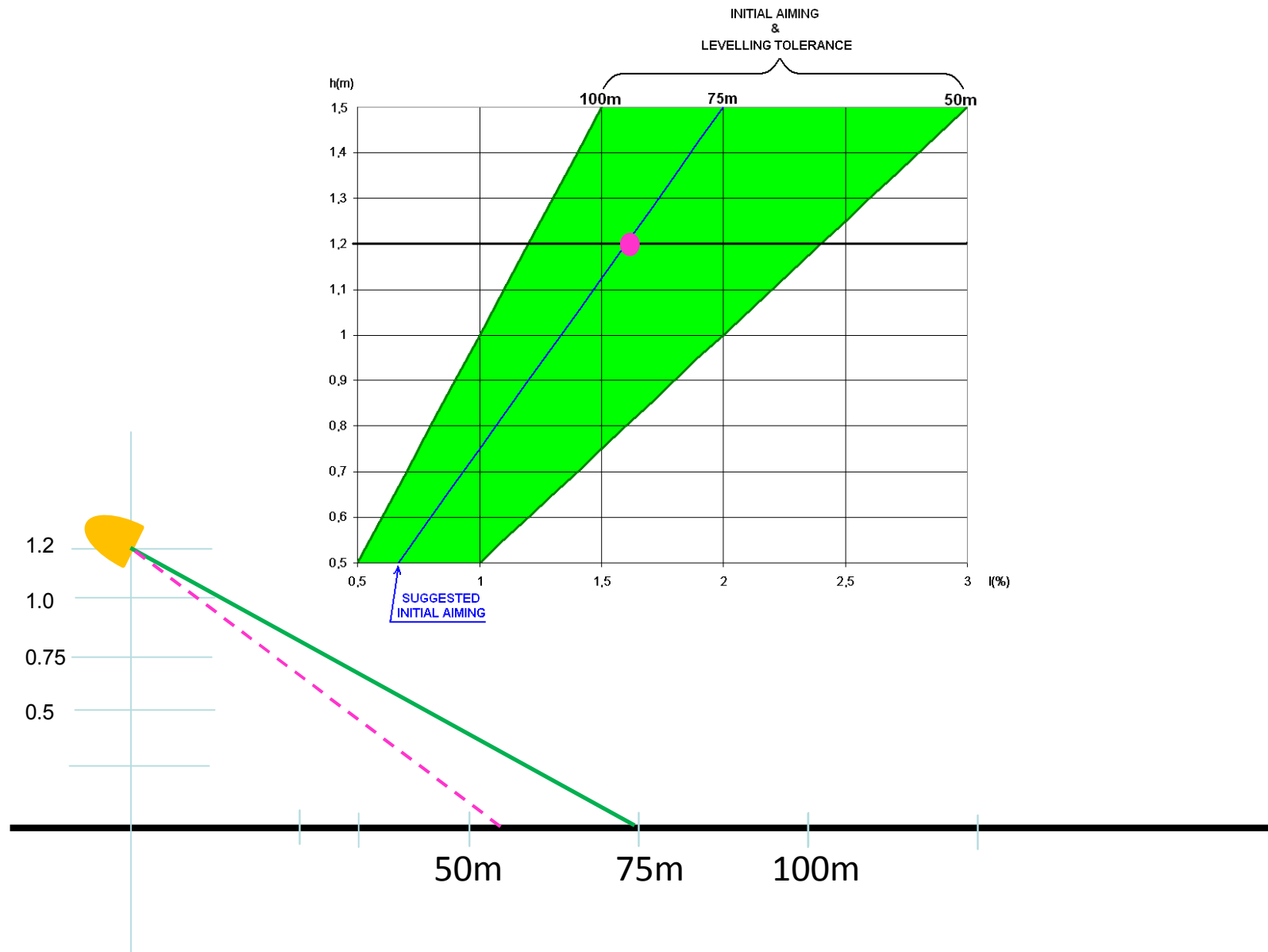


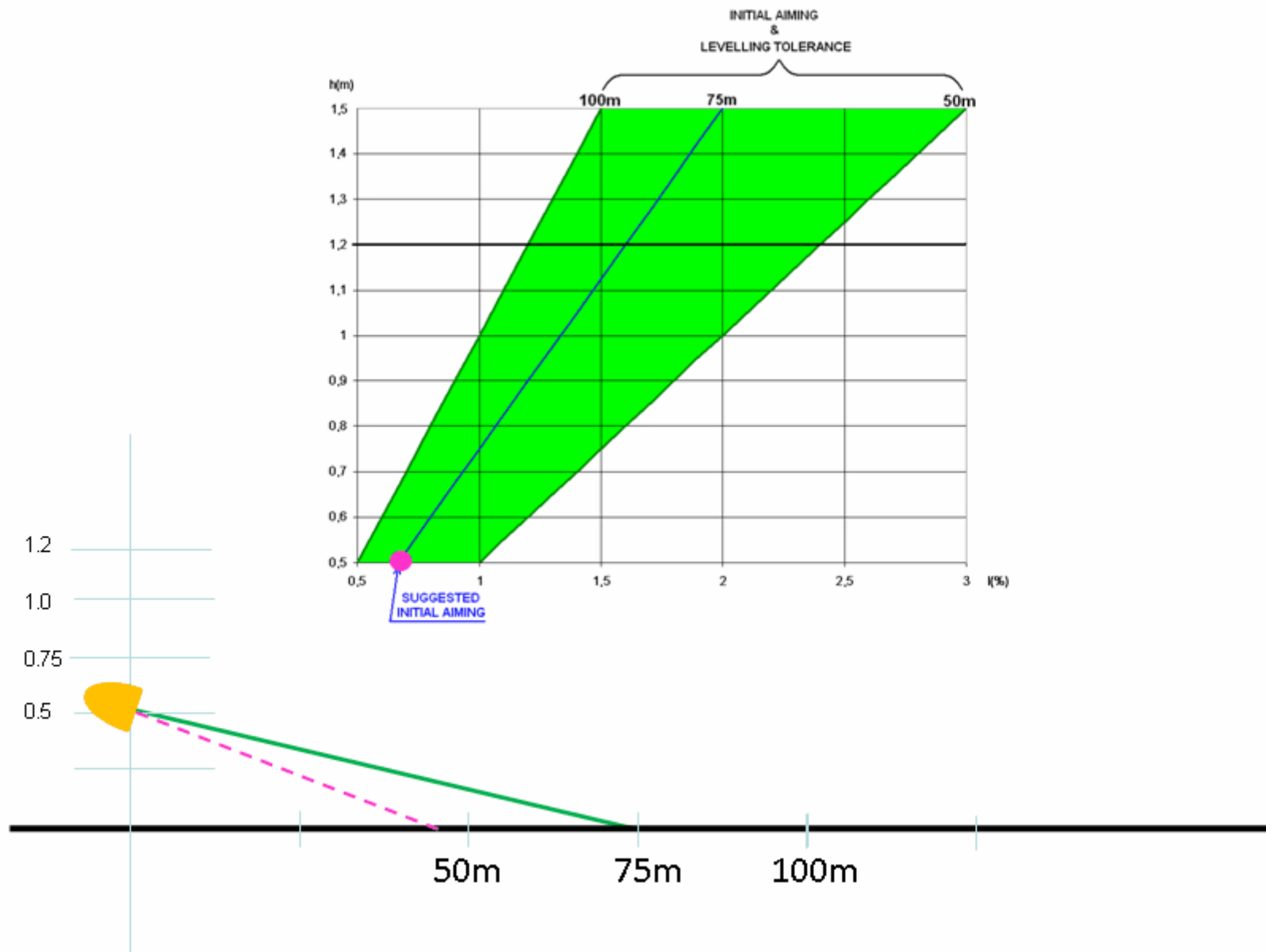








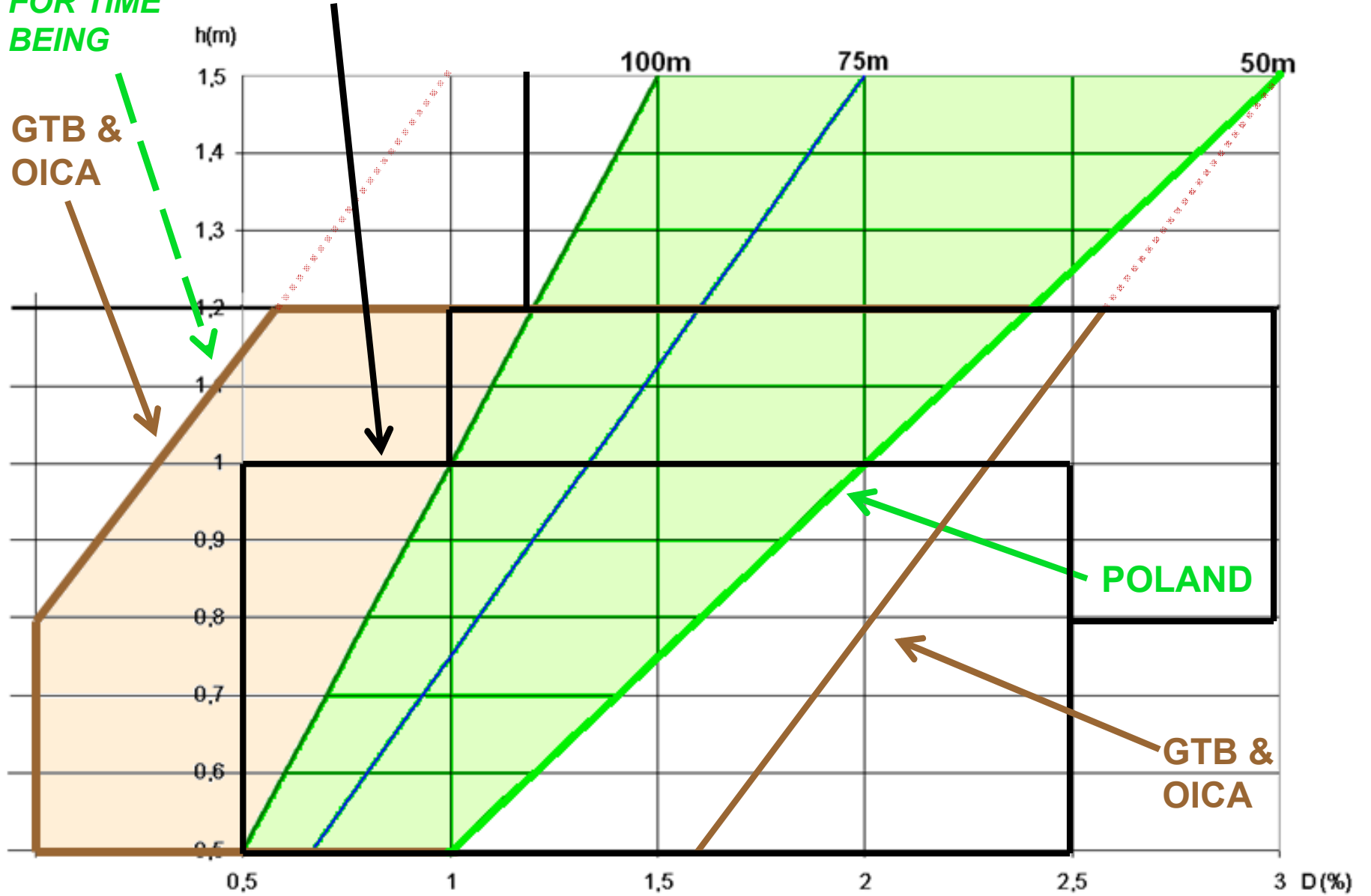




**POLAND  
FOR TIME  
BEING**

**Reg. 48**

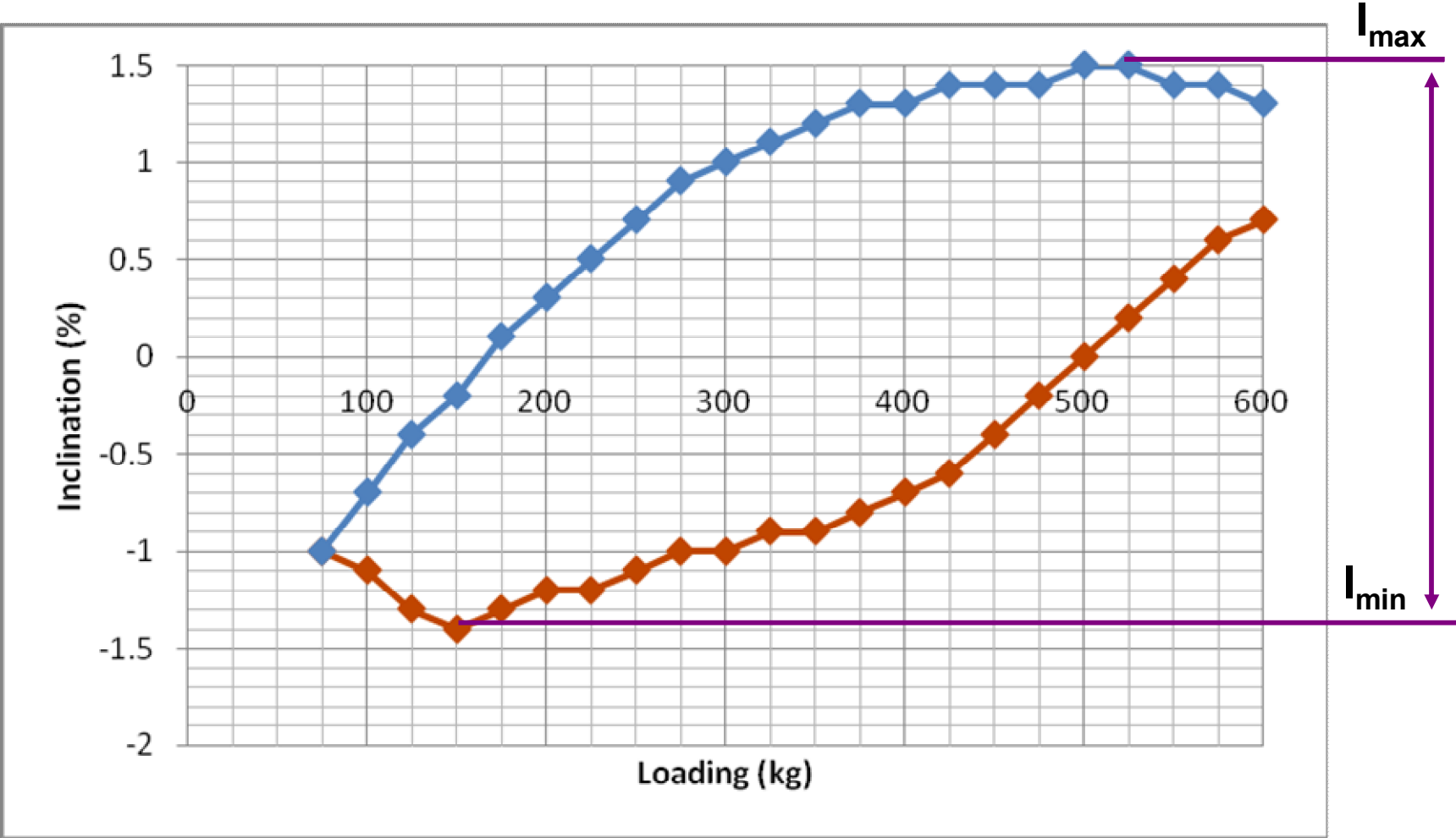
**GTB &  
OICA**



**POLAND**

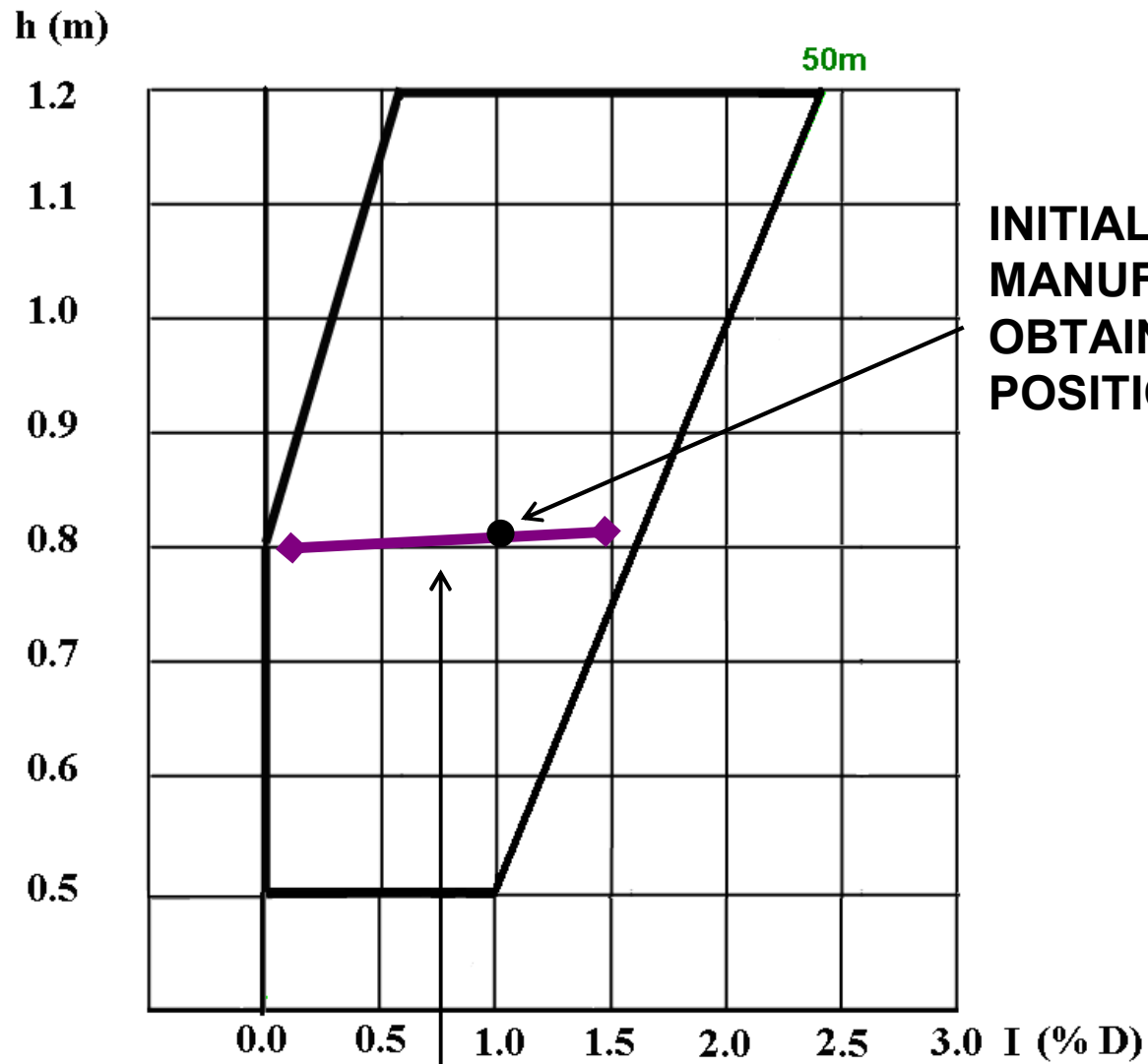
**GTB &  
OICA**

# $\Delta I$ MEASUREMENT PROCEDURE

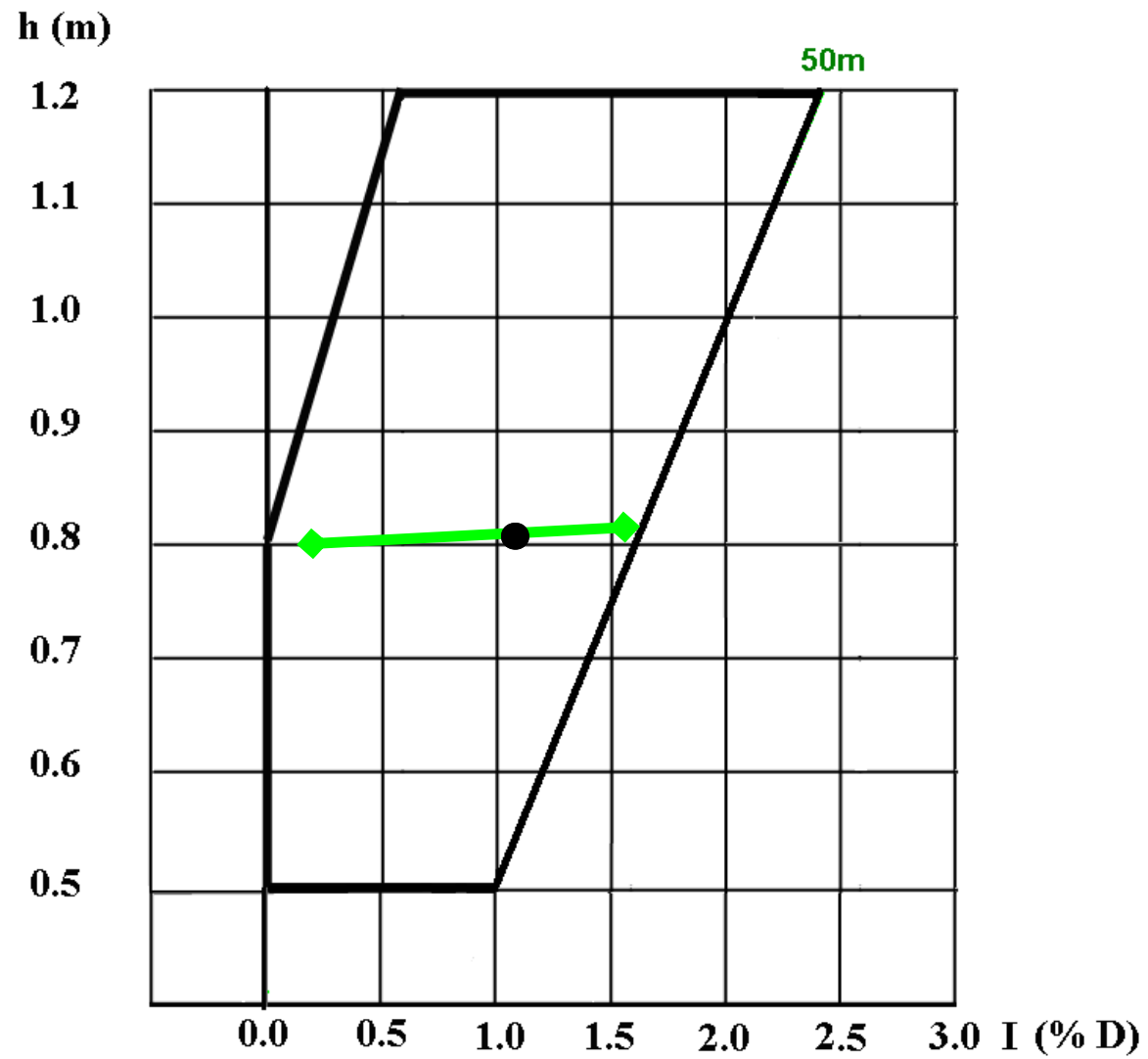


$$\Delta I = I_{max} - I_{min}$$

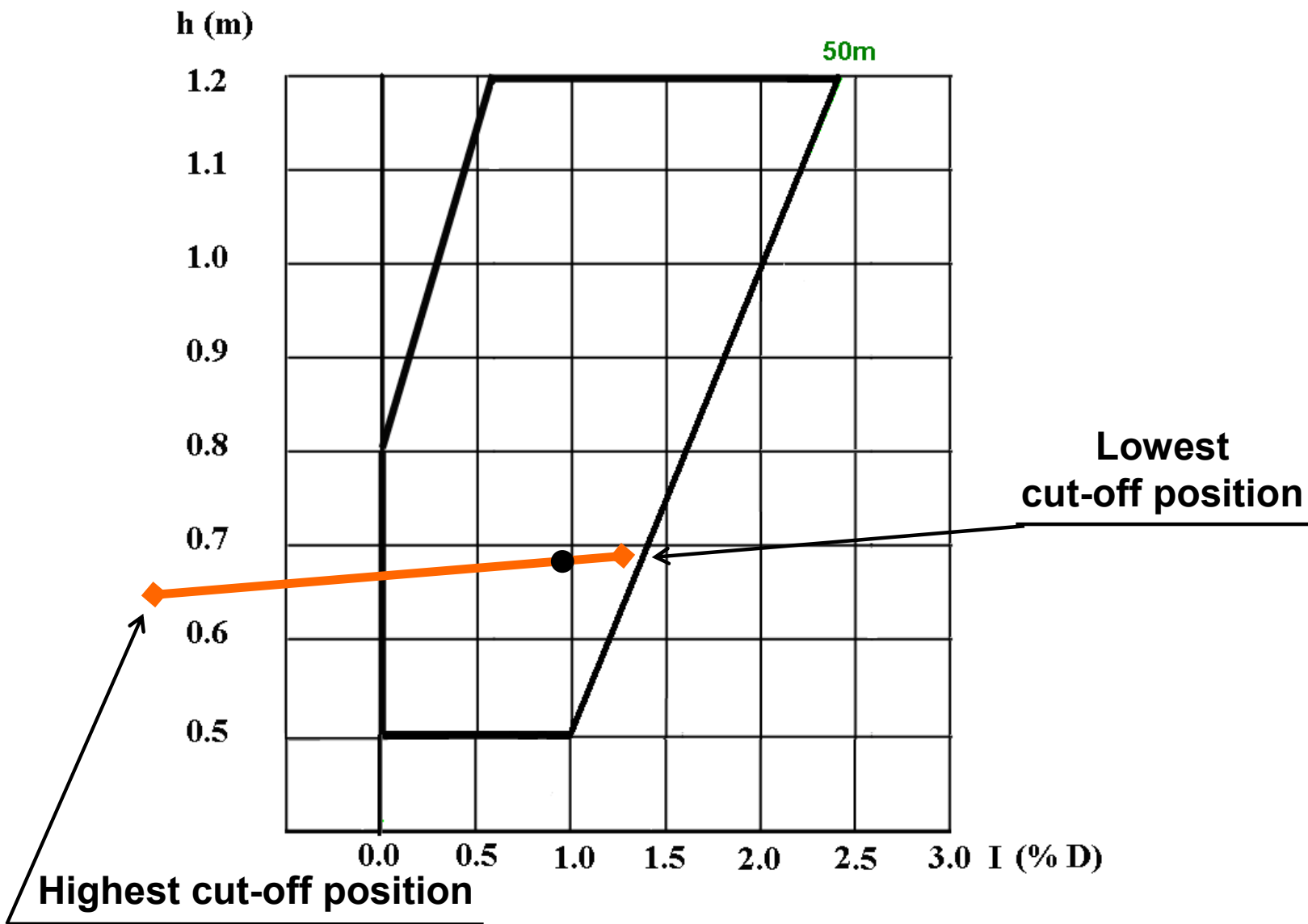
# $\Delta I$ „PLACEMET IN TOLLERANCES BOX”

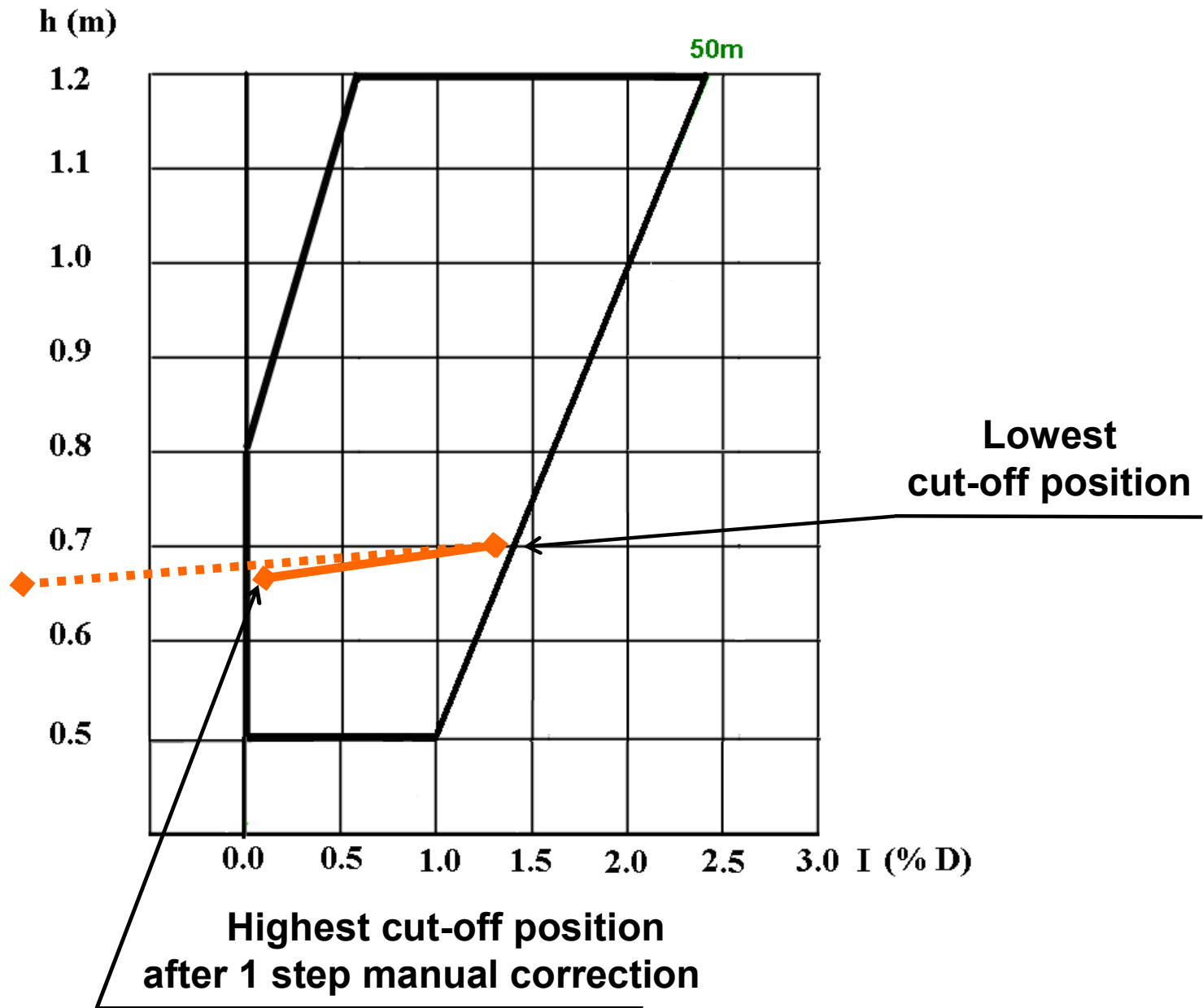


$$\Delta I = I_{\max} - I_{\min}$$

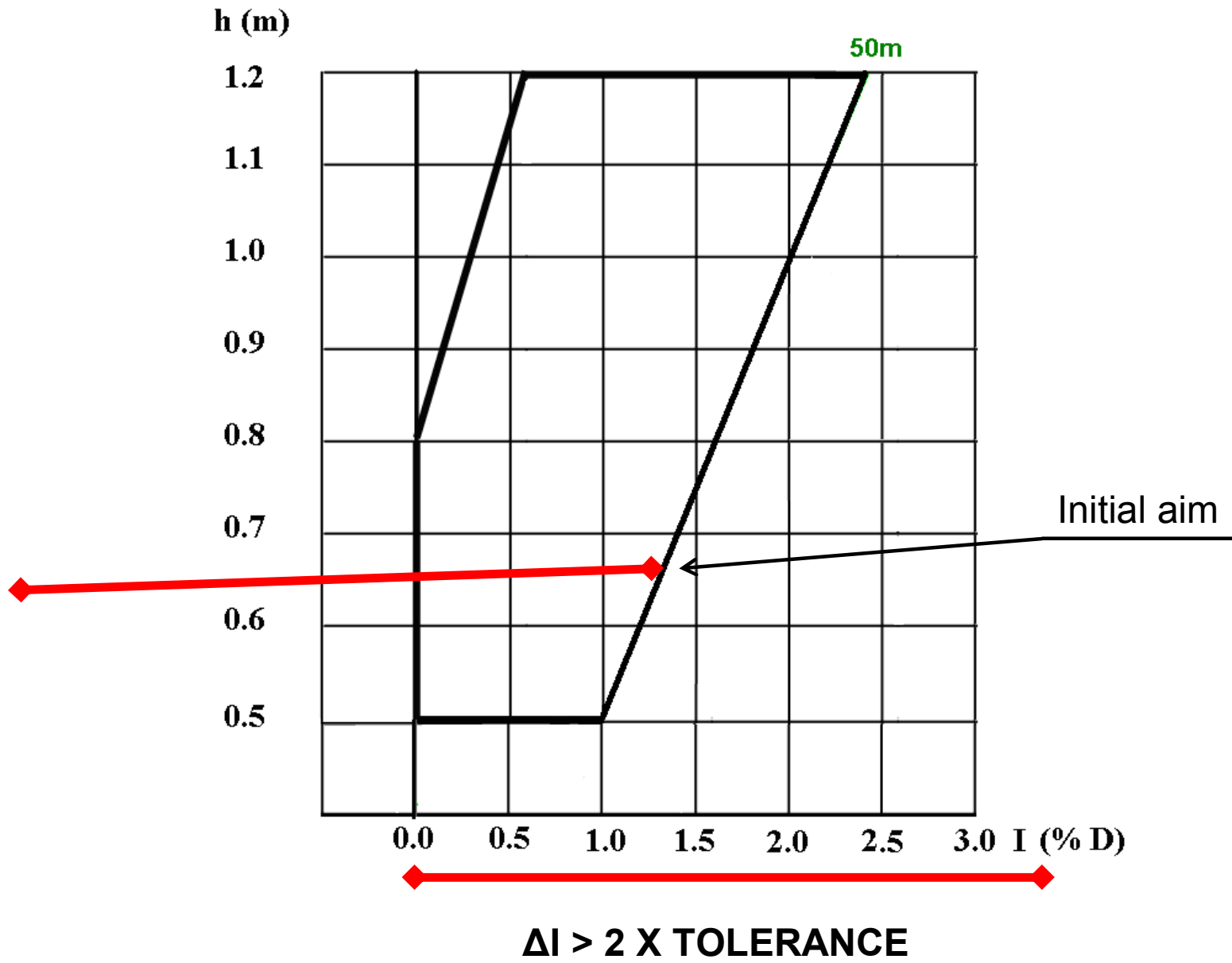


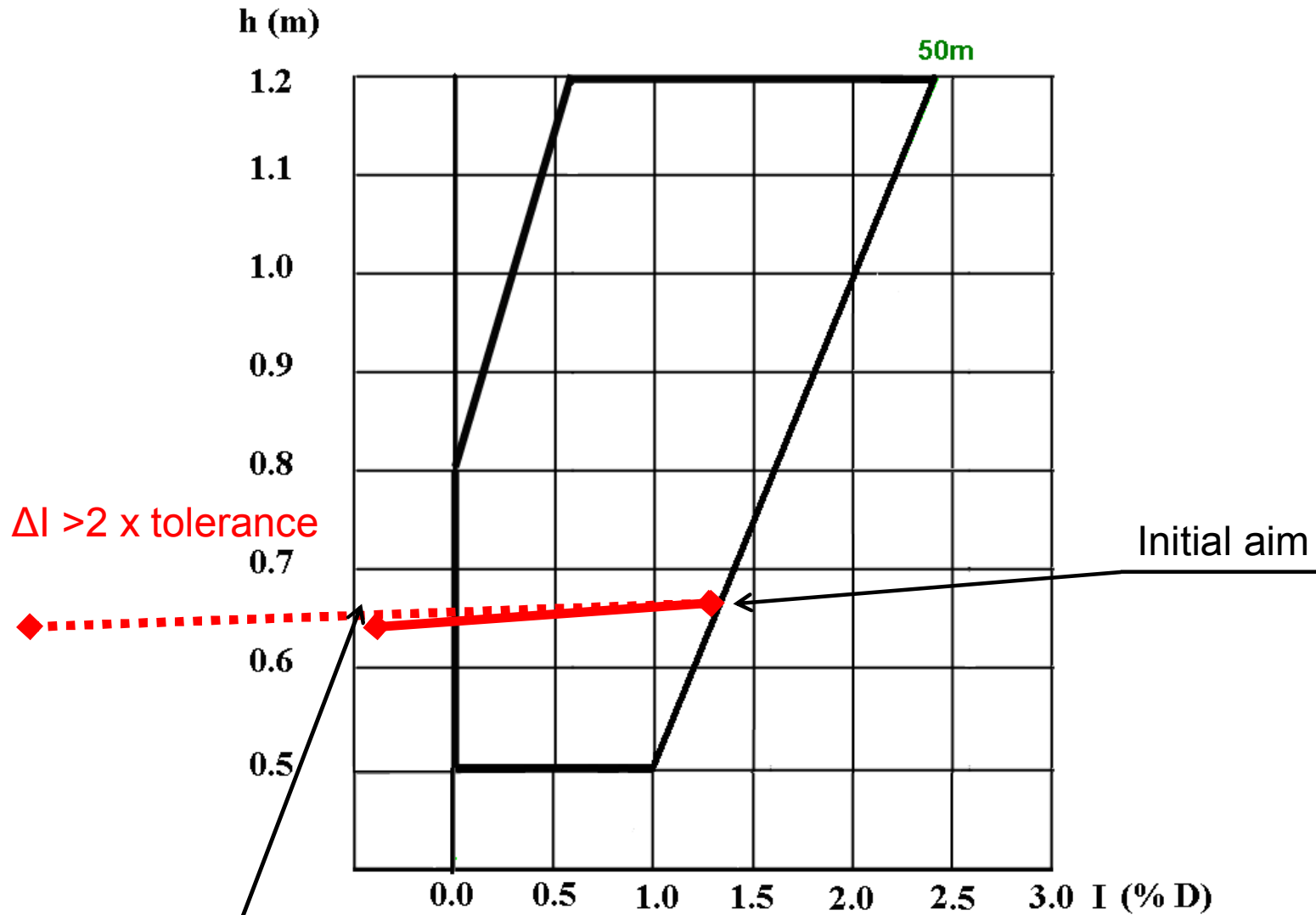
**$\Delta I$  INSIDE TOLERANCE - NO LEVELLING DEVICE NEEDED**









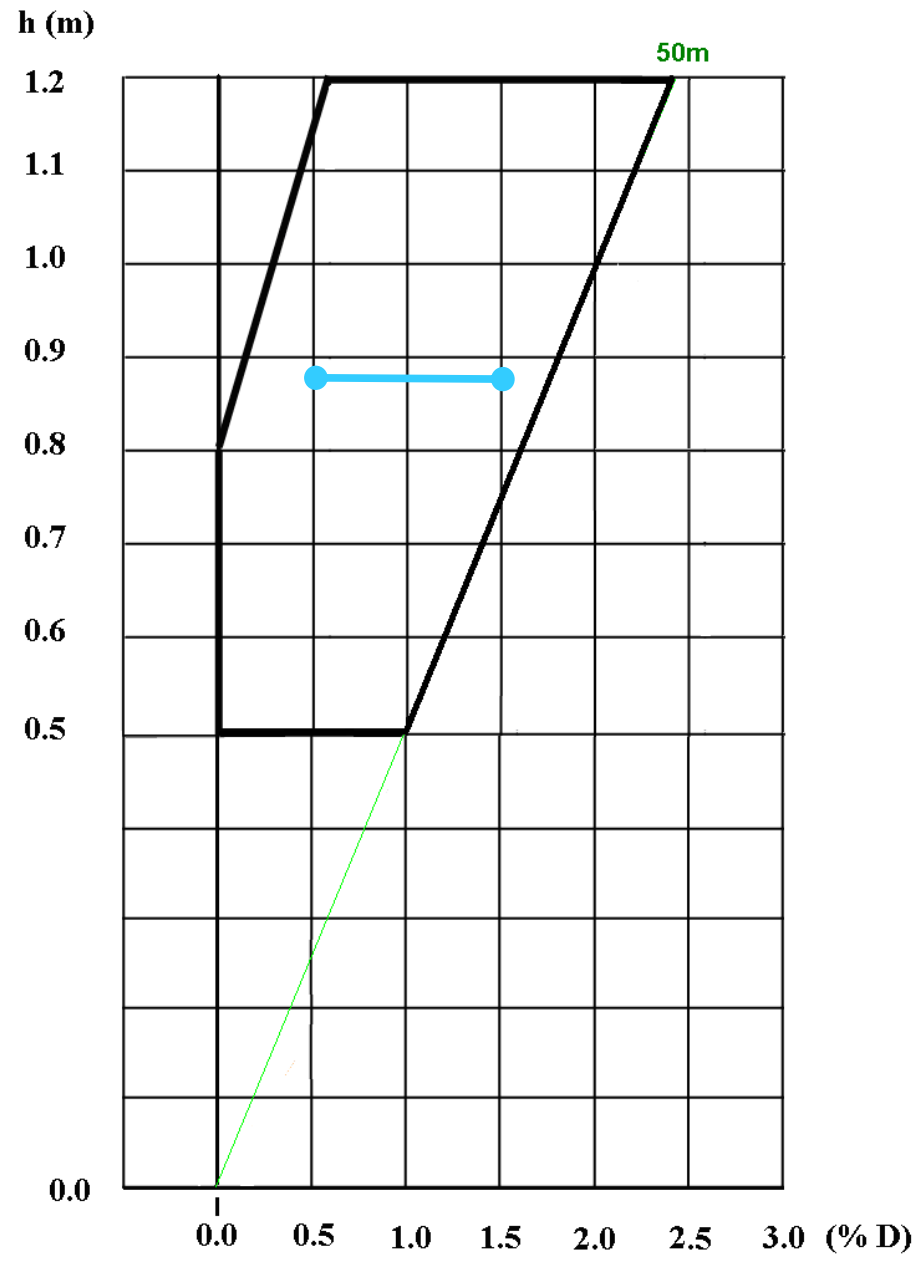


No possibility to correct  
with 1 step manual device

**AUTOMATIC LEVELLING REQUIRED**

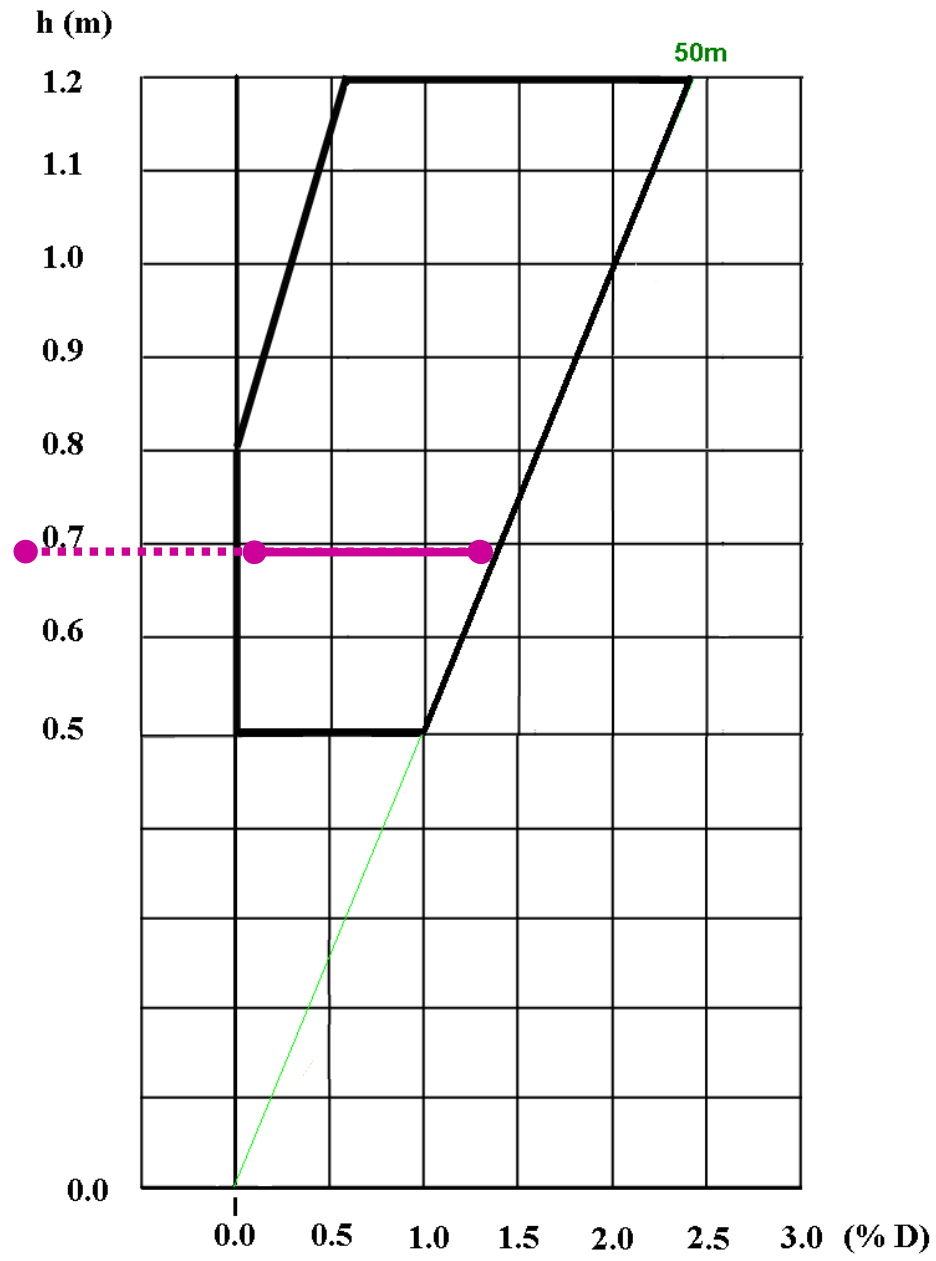
# Measurement results

Vehicle	Headlamp height (m)	$\Delta I$ (I <sub>max</sub> - I <sub>min</sub> )
1	0.74	1.6
2	0.70	0.9
3	0.64	2.1
4	0.84	1.2
5	0.82	1.4
6	0.88	1
7	0.83	1.1
8	0.68	1.7
9	0.87	1.7
10	0.67	3.3
11	0.80	2.1
12	0.74	2
13	0.89	2.3
14	0.79	1.3
15	0.66	1.7
16	0.69	2.4
17	0.75	1.6
18	0.73	2.1
19	0.72	2
20	0.70	1.6
21	0.76	2.2



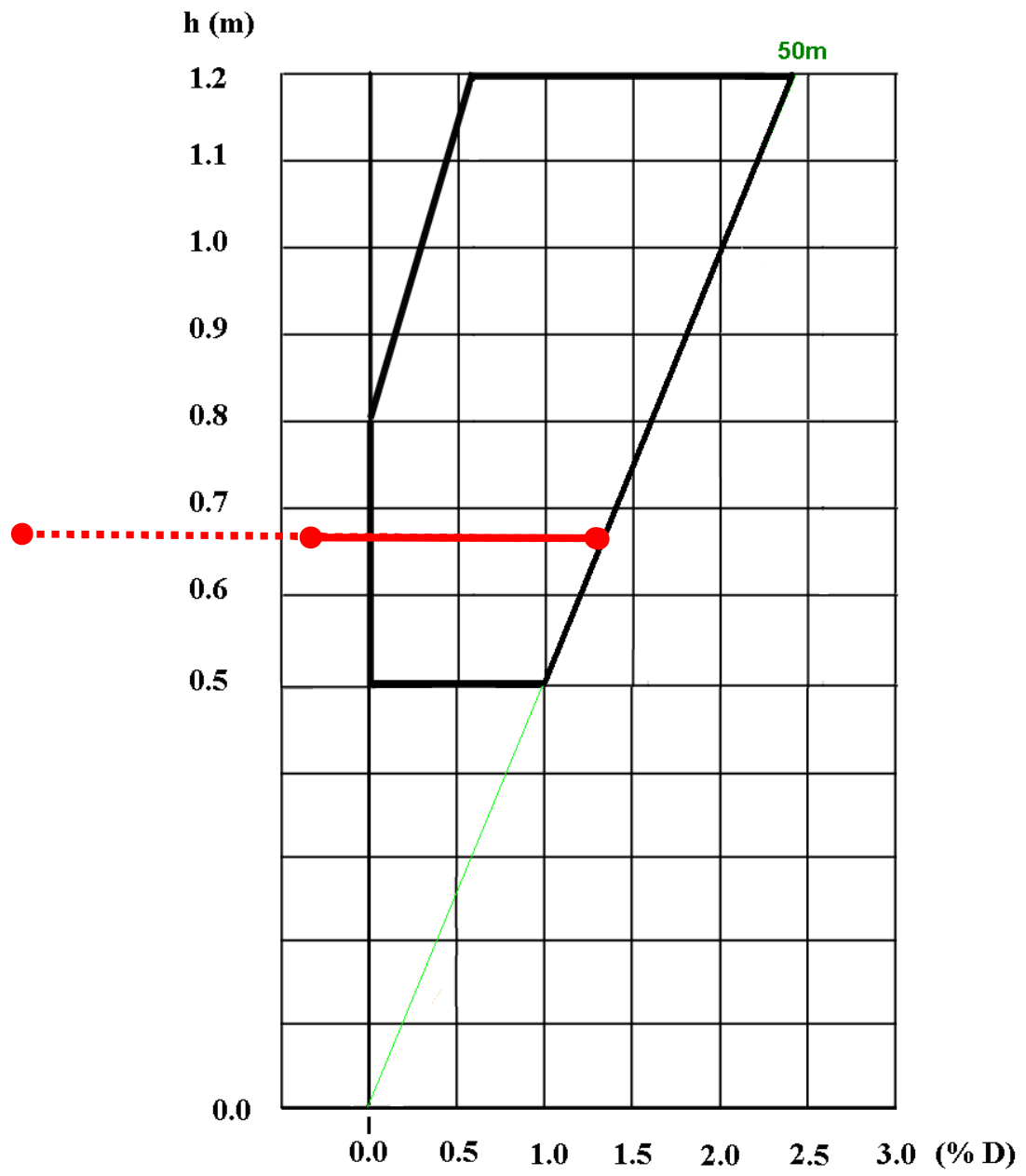
### Example No 6

No levelling device  
needed



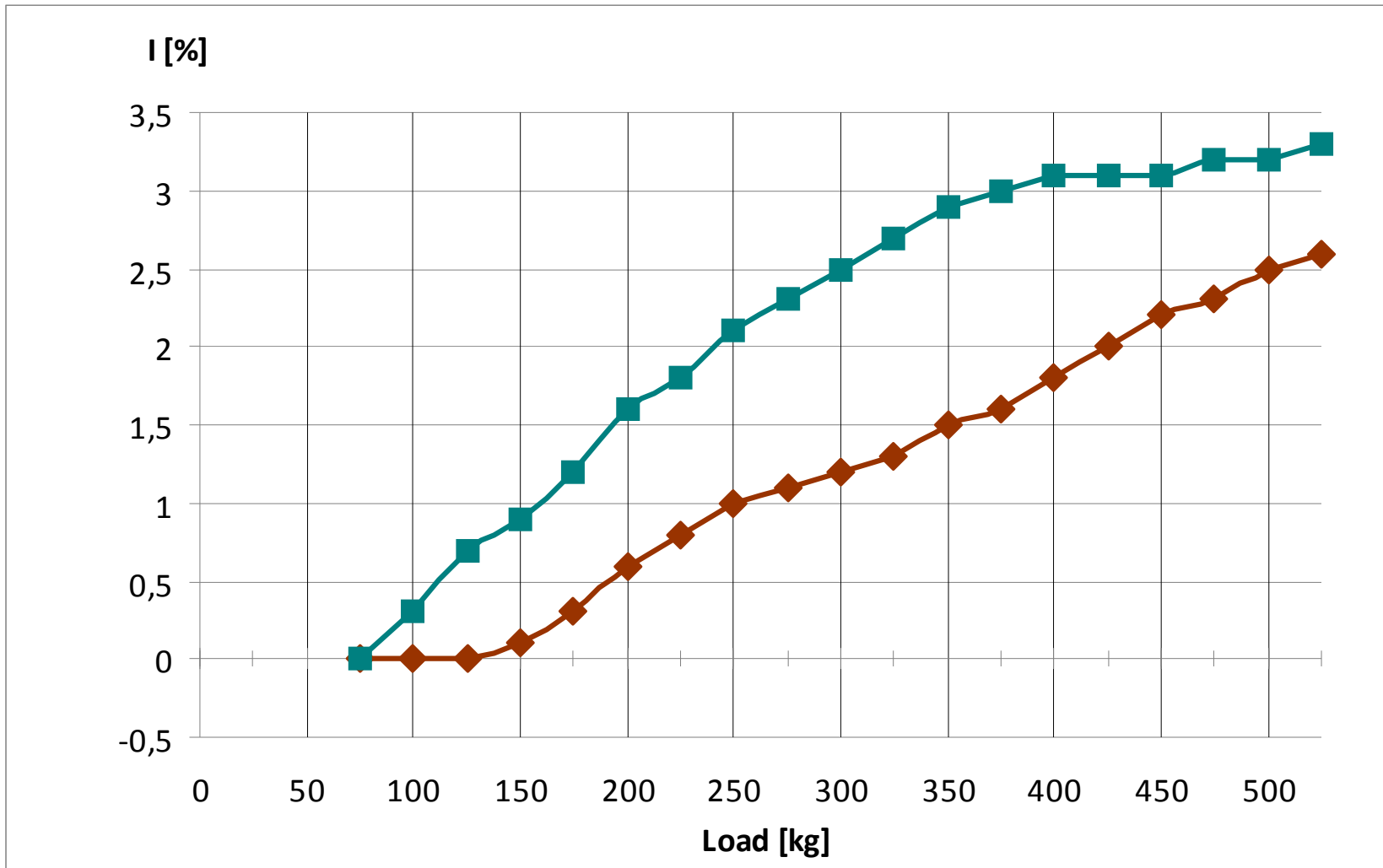
**Example No 16**

**Inside tolerances with  
two position manual  
device**

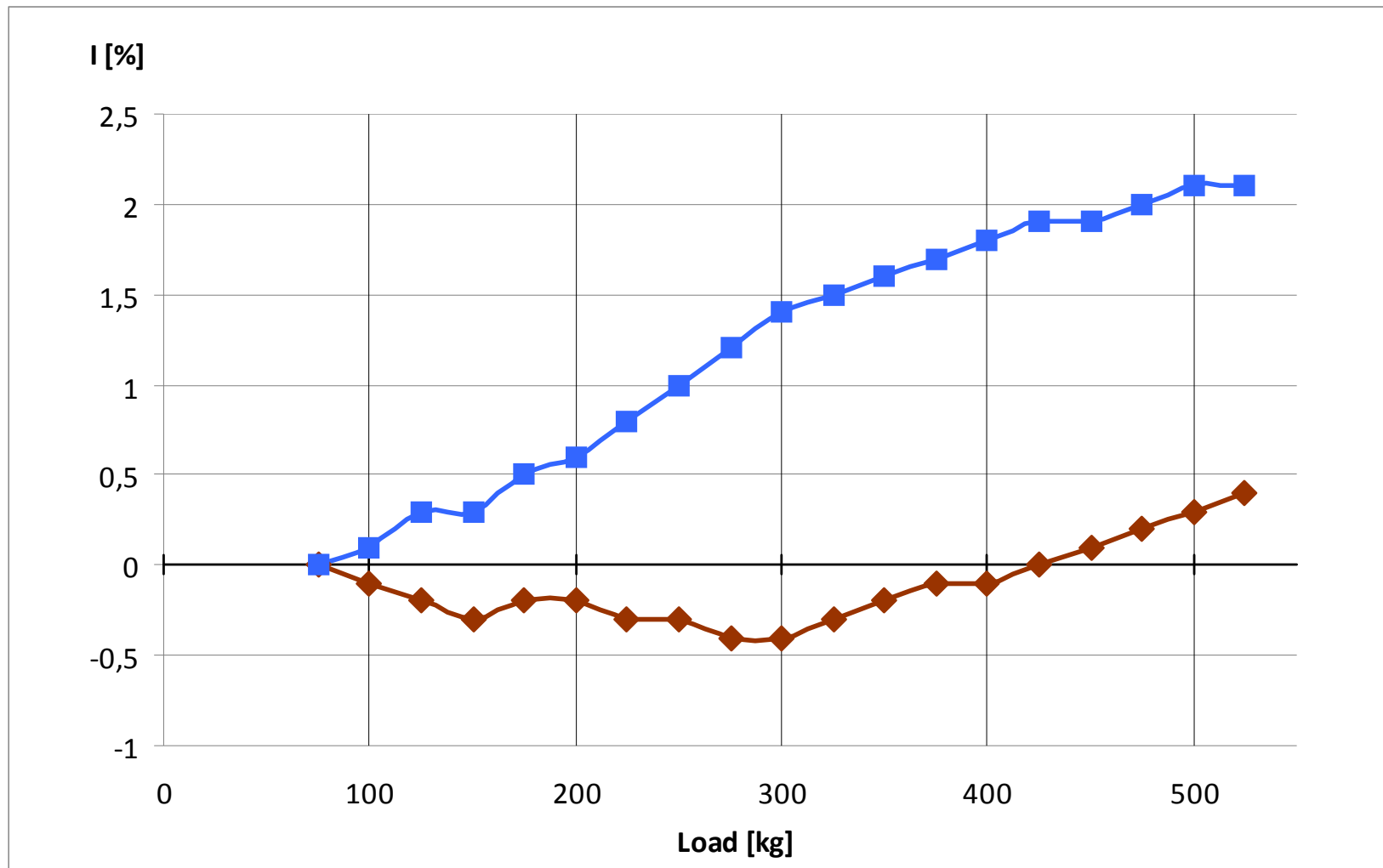


**Example No 10**

**Automatic levelling  
needed**

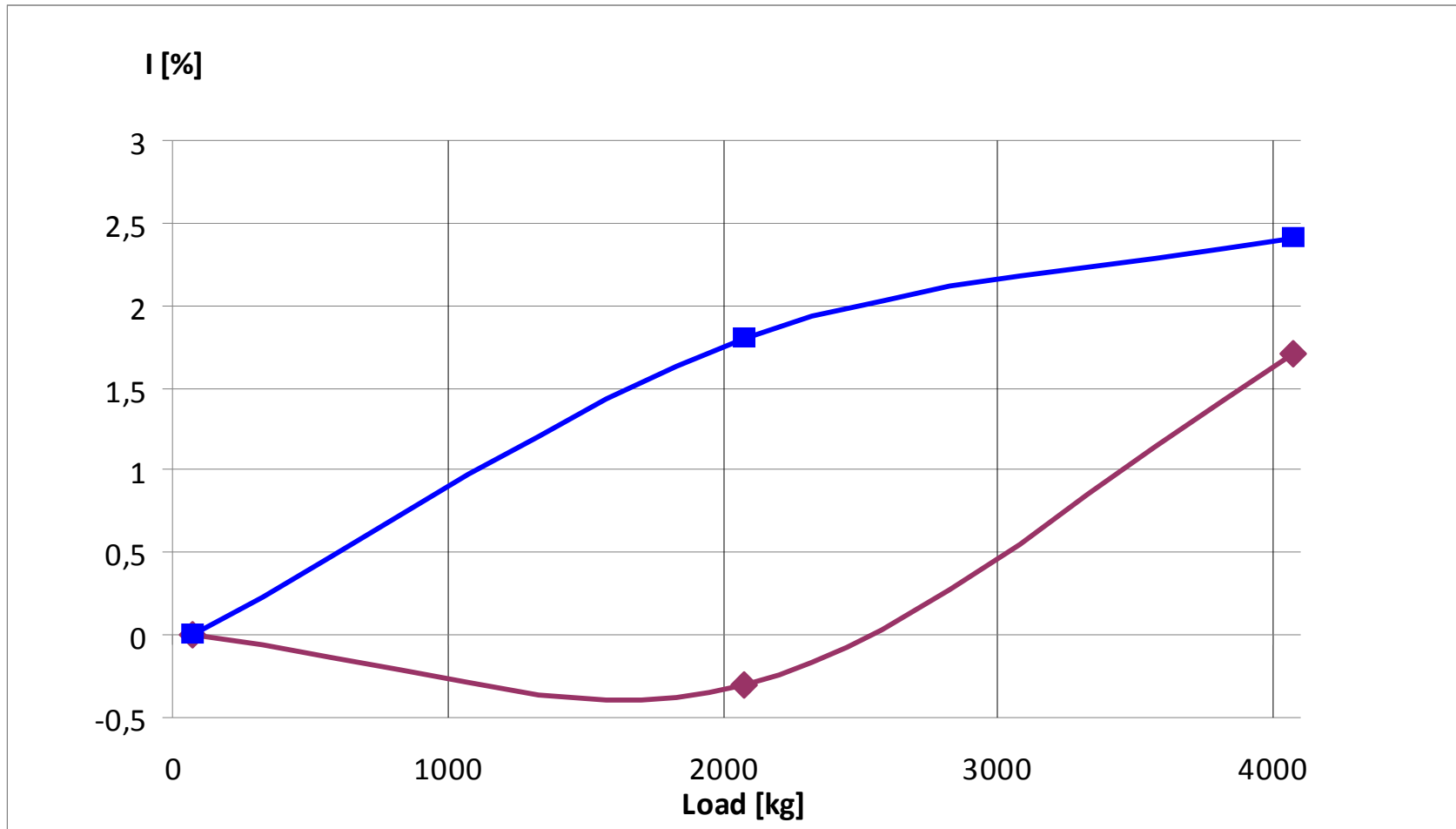


**Real example - passenger car**

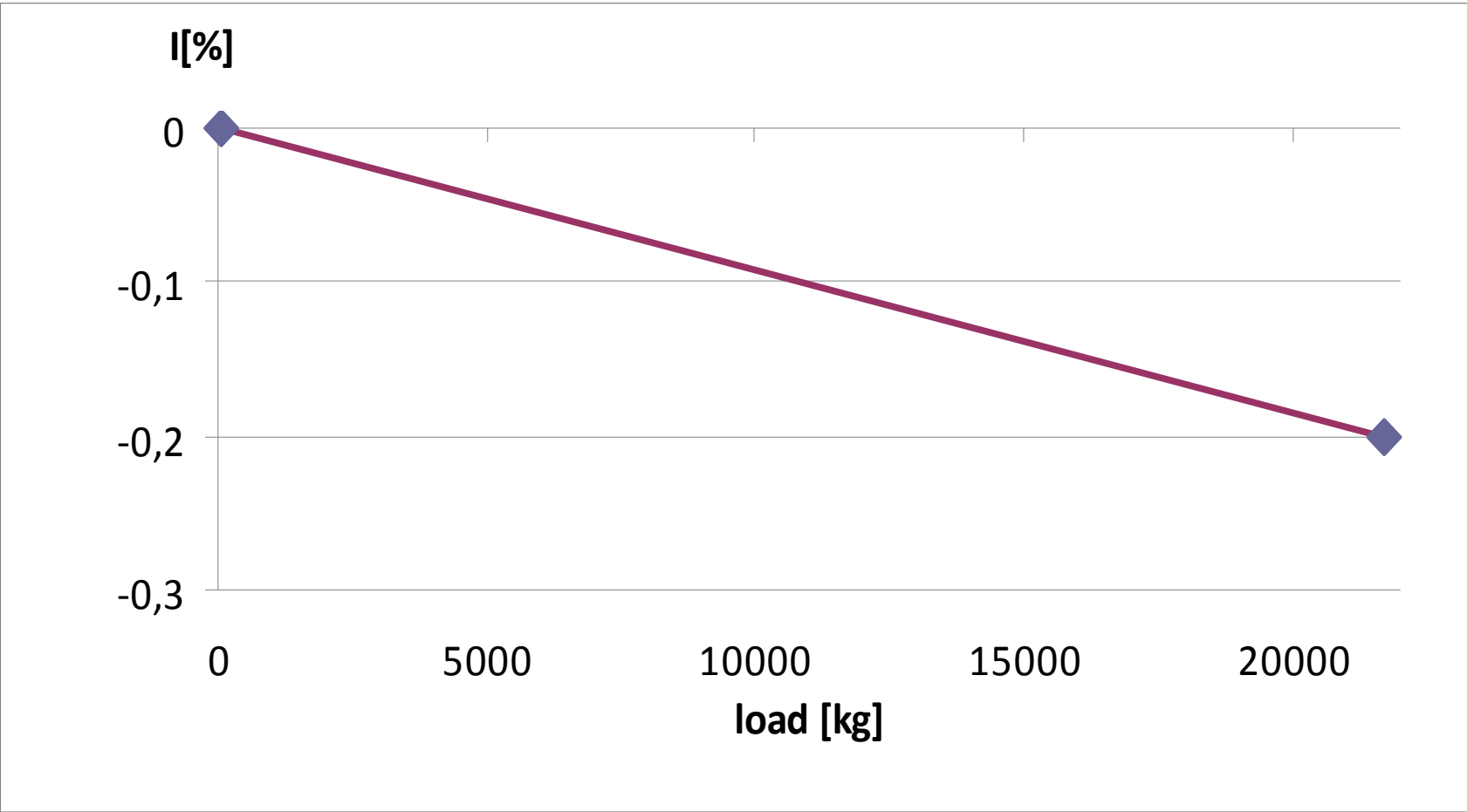


**Real example - passenger car**





**Real example - truck. Spring suspension**



**Real example - heavy truck. Pneumatic suspension**



**THANK YOU FOR YOUR  
ATTENTION**

