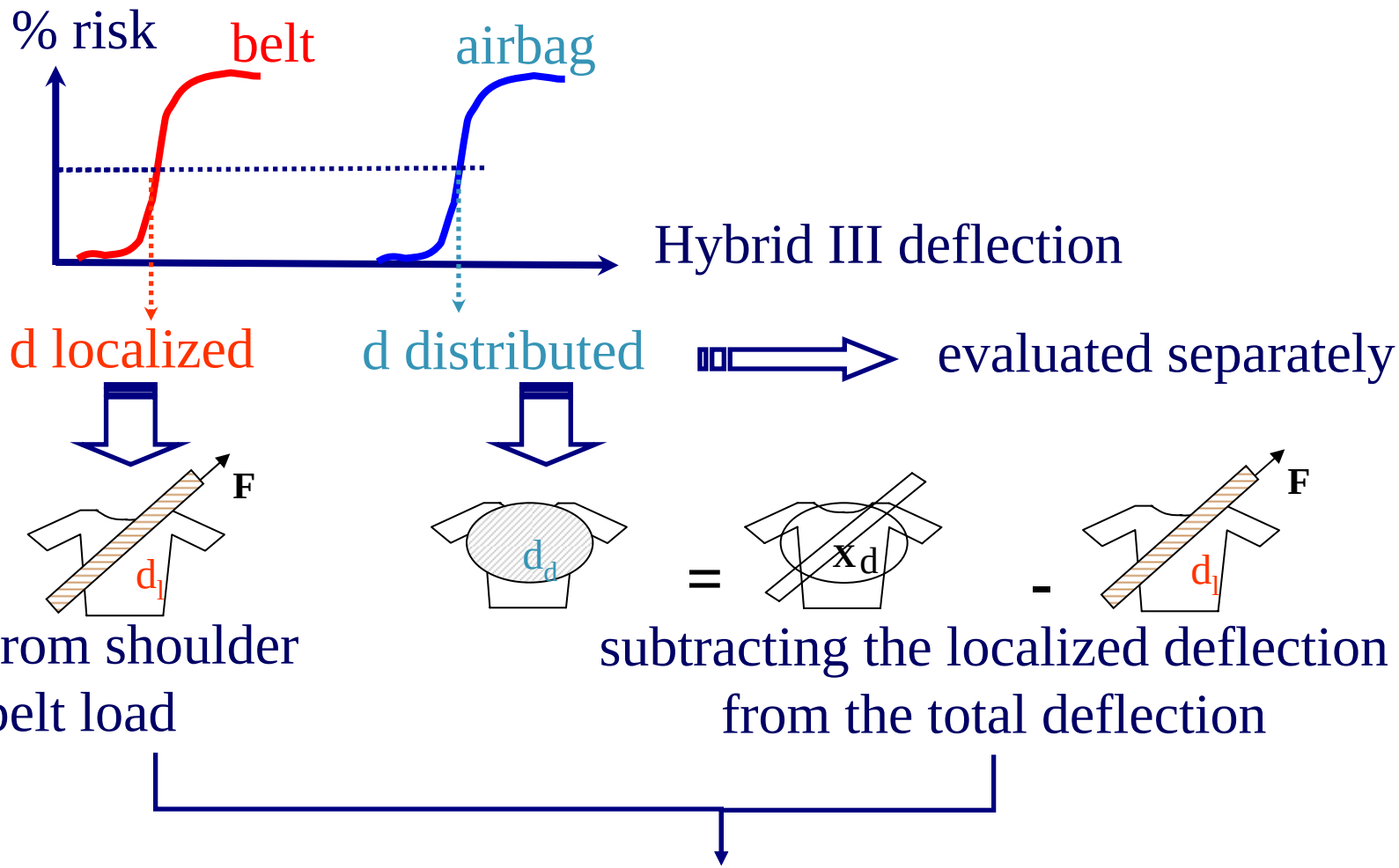
DEQ Update
Injury Risk Curves

GRSP FI Group
11th of October, 2012
Paris

Equivalent Deflection (Deq)



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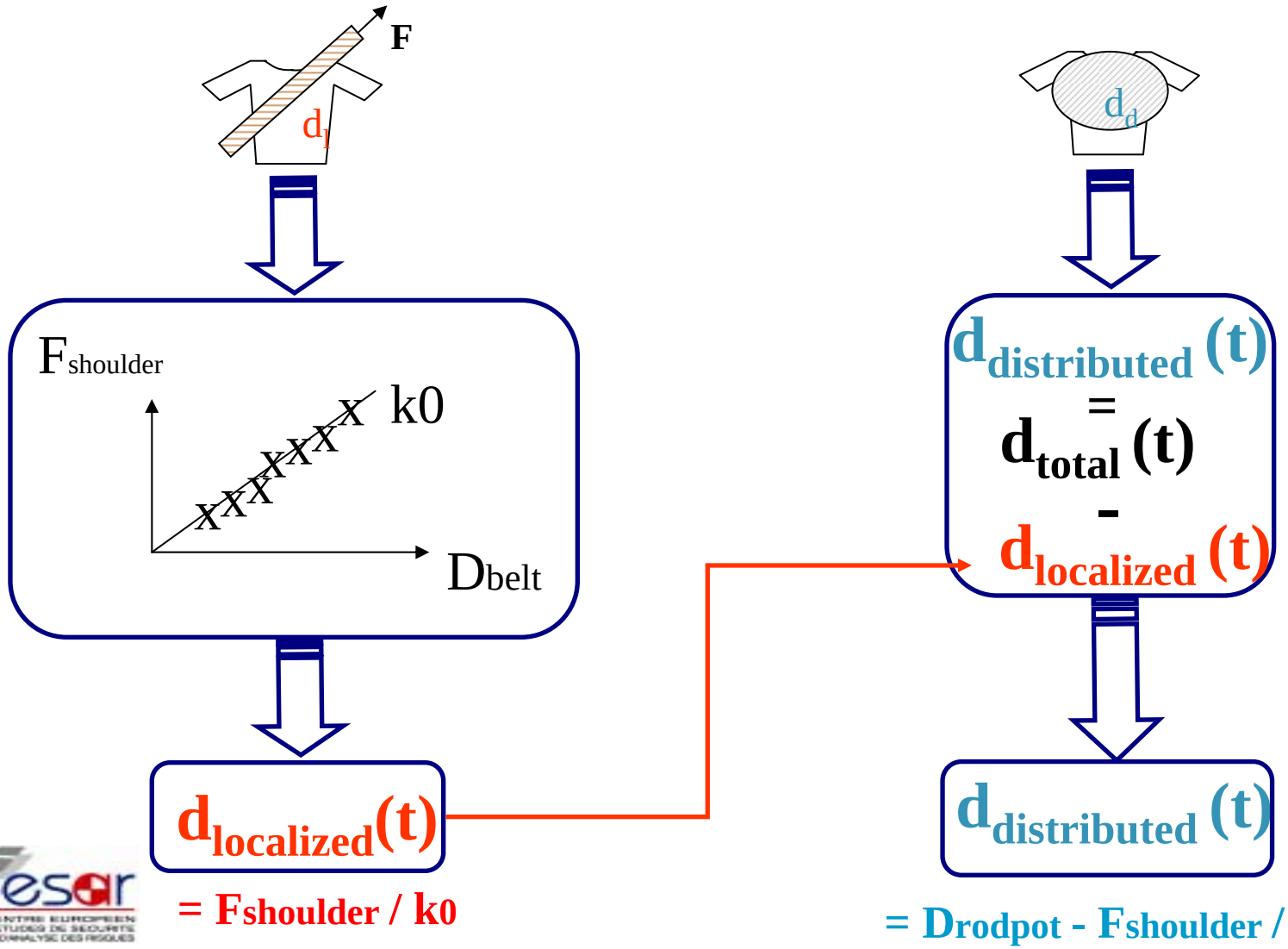

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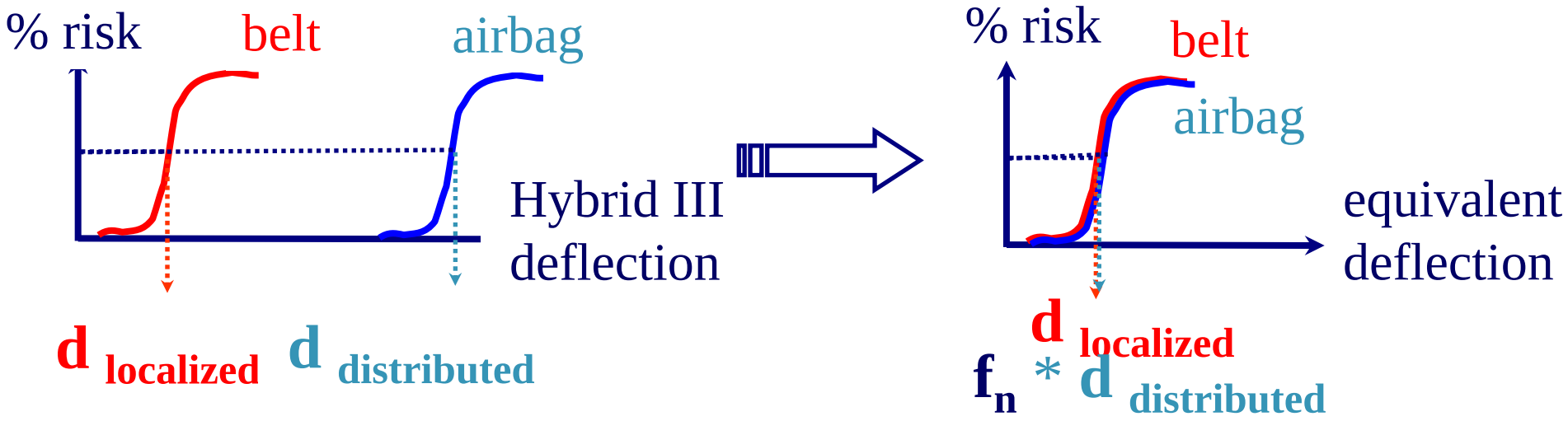
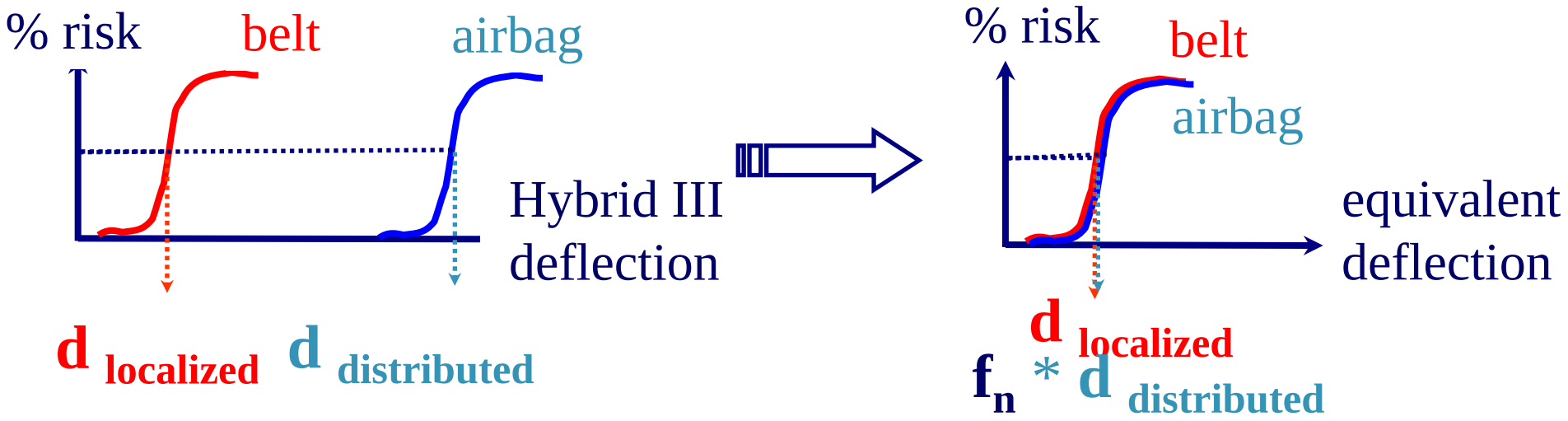
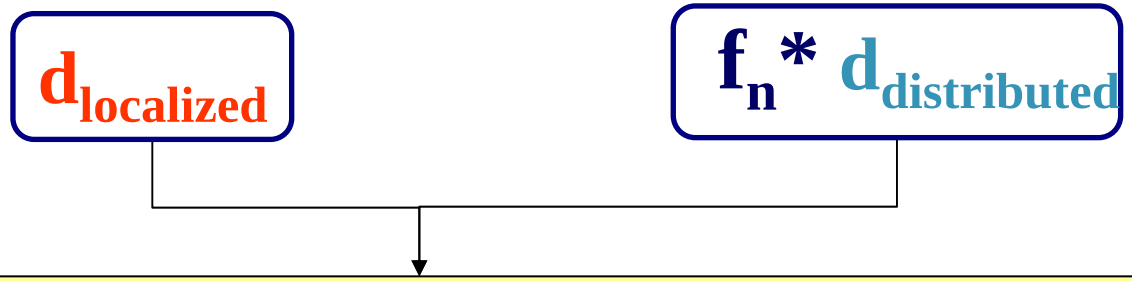


$d_{localized}$ $f_n * d_{distributed}$

$$d_{equivalent} = d_{localized} + f_n * d_{distributed}$$

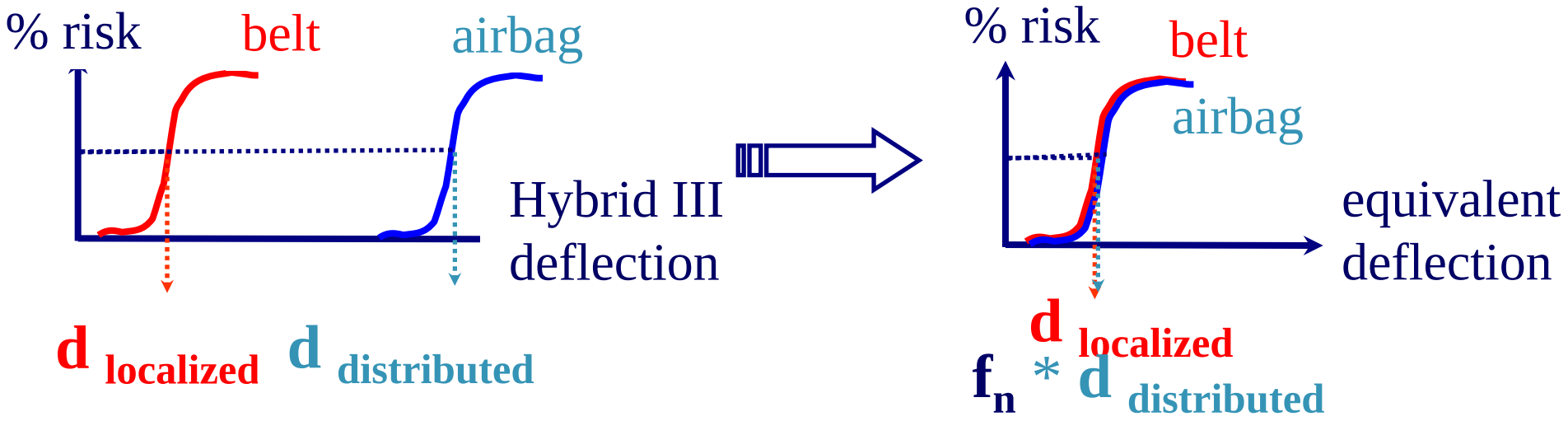
Equivalent Deflection (Deq)





$$d_{equivalent} = Fshoulder / k0 + f_n * (Drodpot - Fshoulder / k0)$$

Equivalent Deflection (Deq)



$d_{localized}$ $f_n * d_{distributed}$

$$D_{equivalent} = \alpha * Fshoulder + \beta * Drodpot$$

LAB
ACCIDENTOLOGIE, BIOMECANIQUE, COMPORTEMENT HUMAIN

In addition…

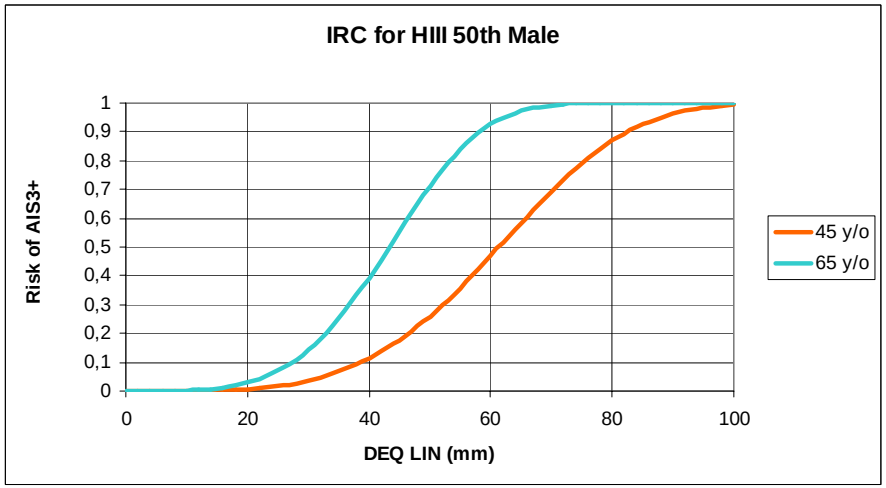
- ⇨ Deq accounts for Rodpot not measuring the maximum deflection
- ⇨ Deq accounts for chest viscous component

Injury Risk Curves

HIII 50th Male

$$Injury\ risk(50th) = 1 - \exp\left(-\exp\left(\frac{\ln(deq) - 4.99 + 0.0174 * age}{0.246}\right)\right)$$

DEQ values		
HIII 50th	45 y/o	65 y/o
5%	33 mm	23 mm
25%	50 mm	35 mm
50%	62 mm	44 mm

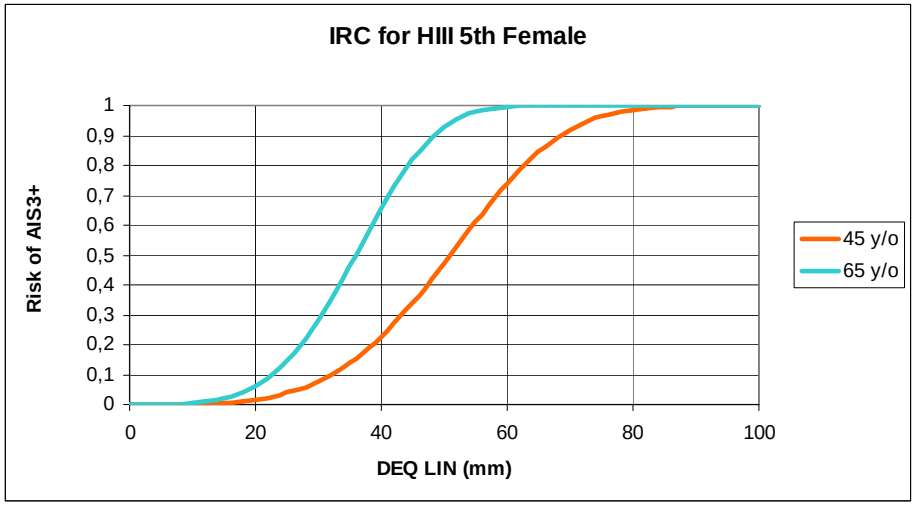


Injury Risk Curve

HIII 5th Female

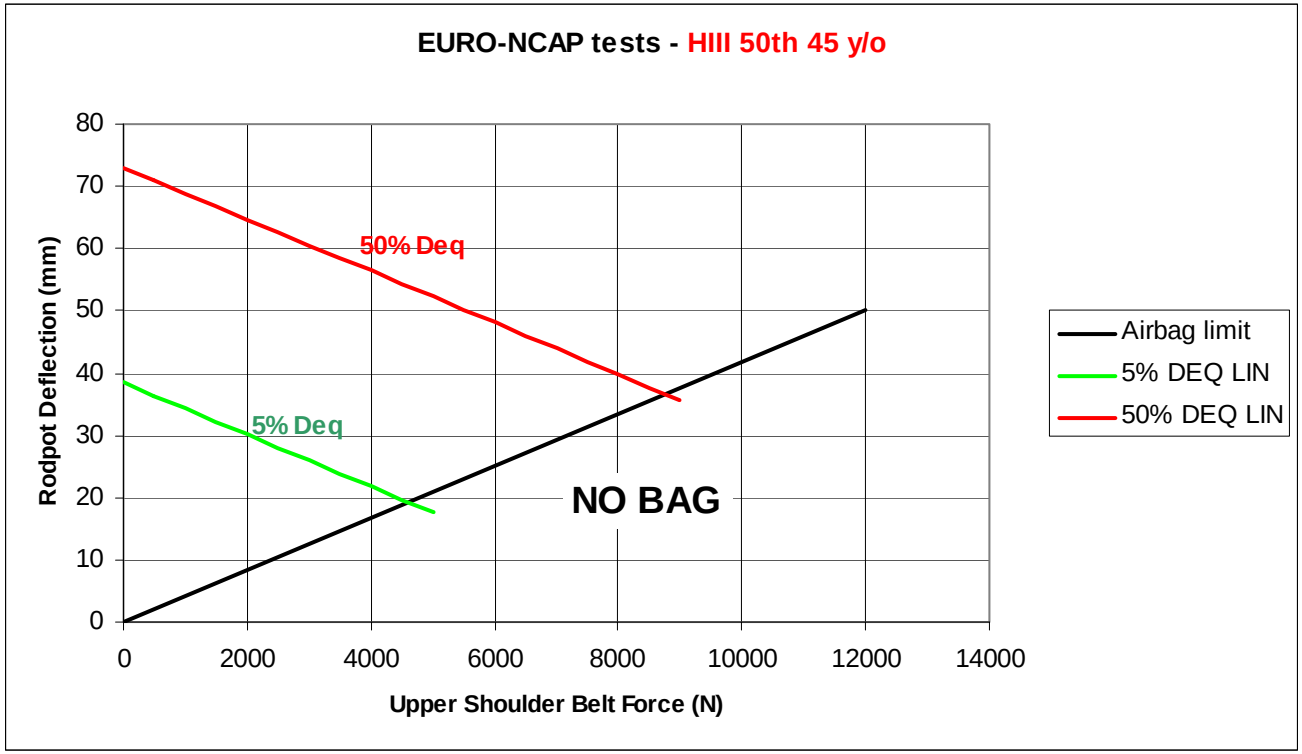
$$Injury\ risk(50th) = 1 - \exp\left(-\exp\left(\frac{\ln(deq/0.83) - 4.99 + 0.0174 * age}{0.246}\right)\right)$$

DEQ values		
HIII 5th	45 y/o	65 y/o
5%	27 mm	19 mm
25%	41 mm	29 mm
50%	51 mm	36 mm



Test results

HIII 50th - 45 y/o

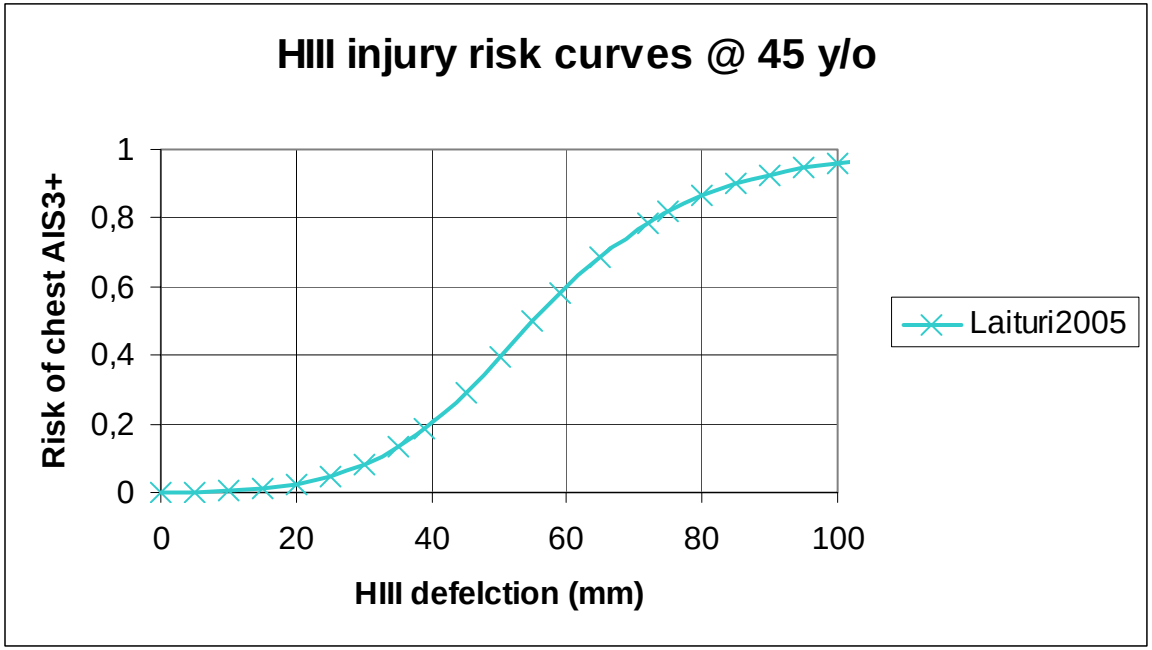


Deq LIN ⇔ 6.6*USBF + 0.84*(Rodpot-3.7*USBF)

Deq IRC has nothing to do with Rodpot IRC
Ex for belt-only : 5kN / 22mm Rodpot ⇔ Deq=36mm

Injury Risk Curve

- Laituri IRC



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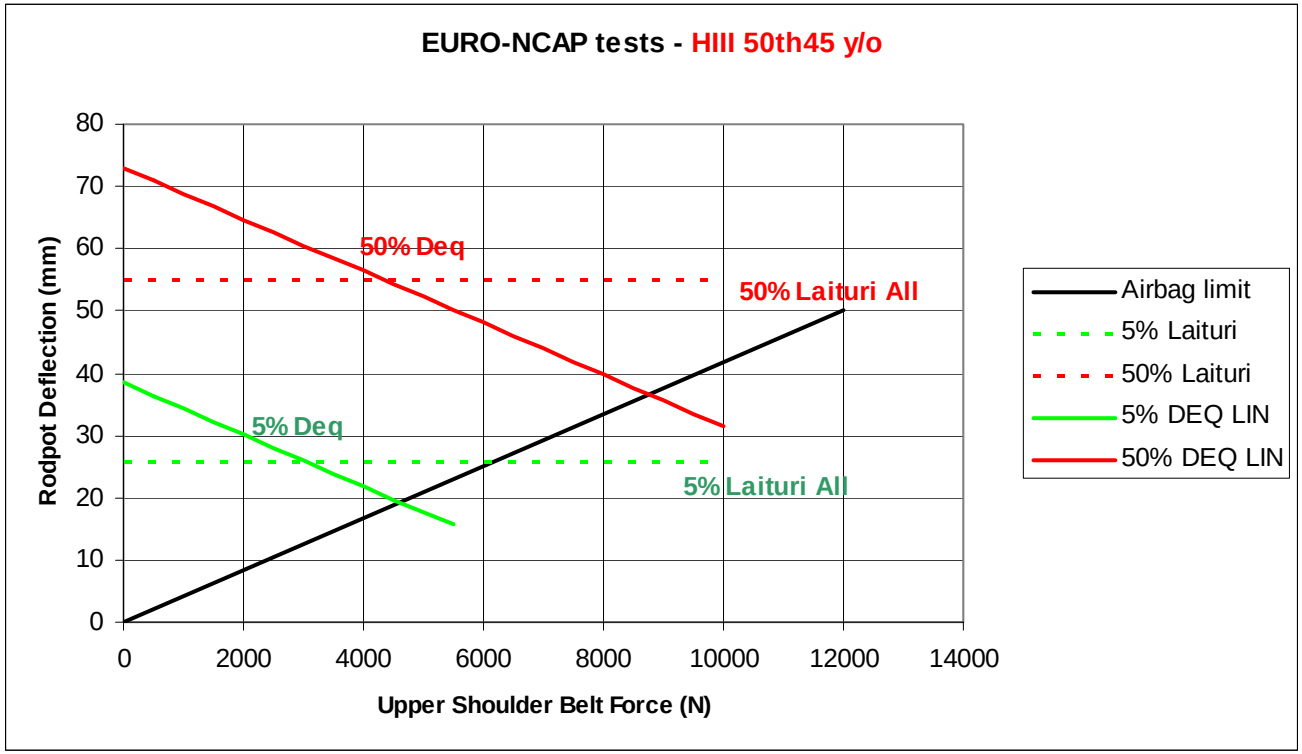

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Injury Risk Curve

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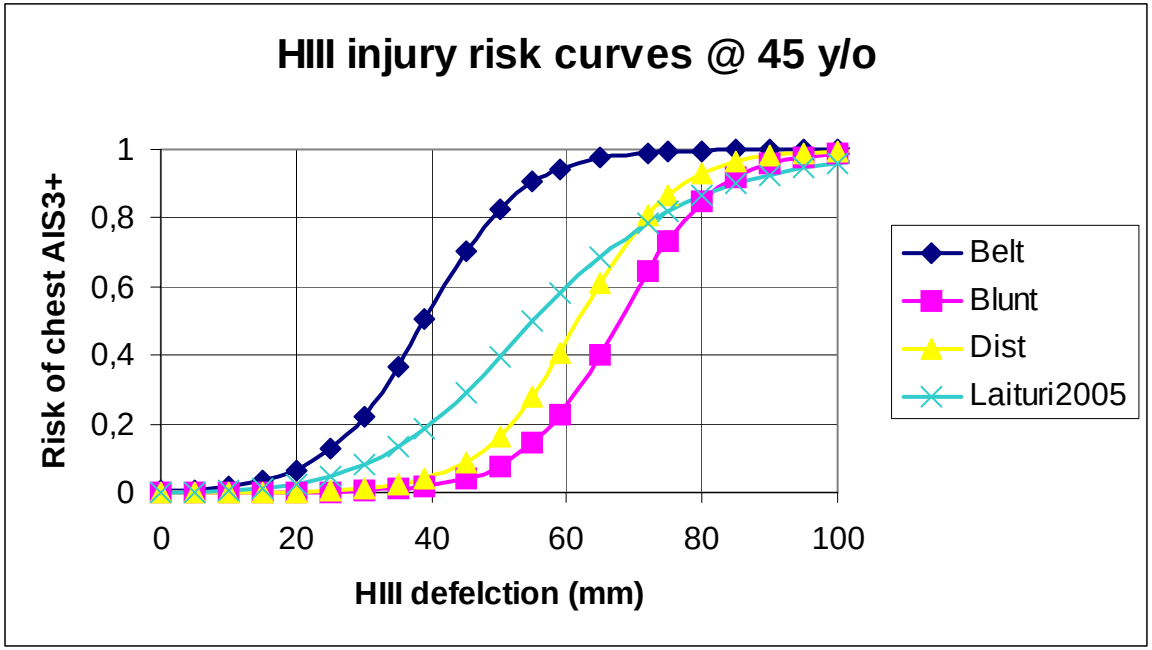

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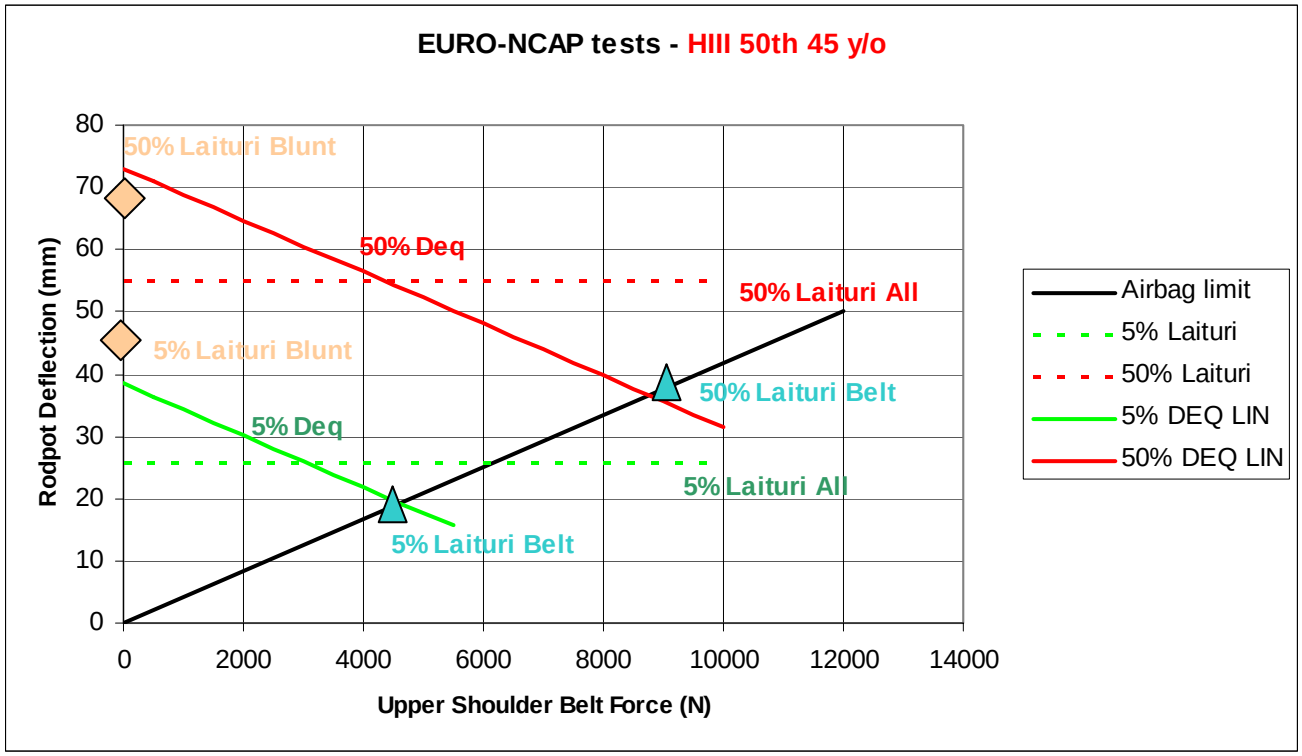

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