

# Effects of Impact Angle on Injury Value using EEVC Impactor

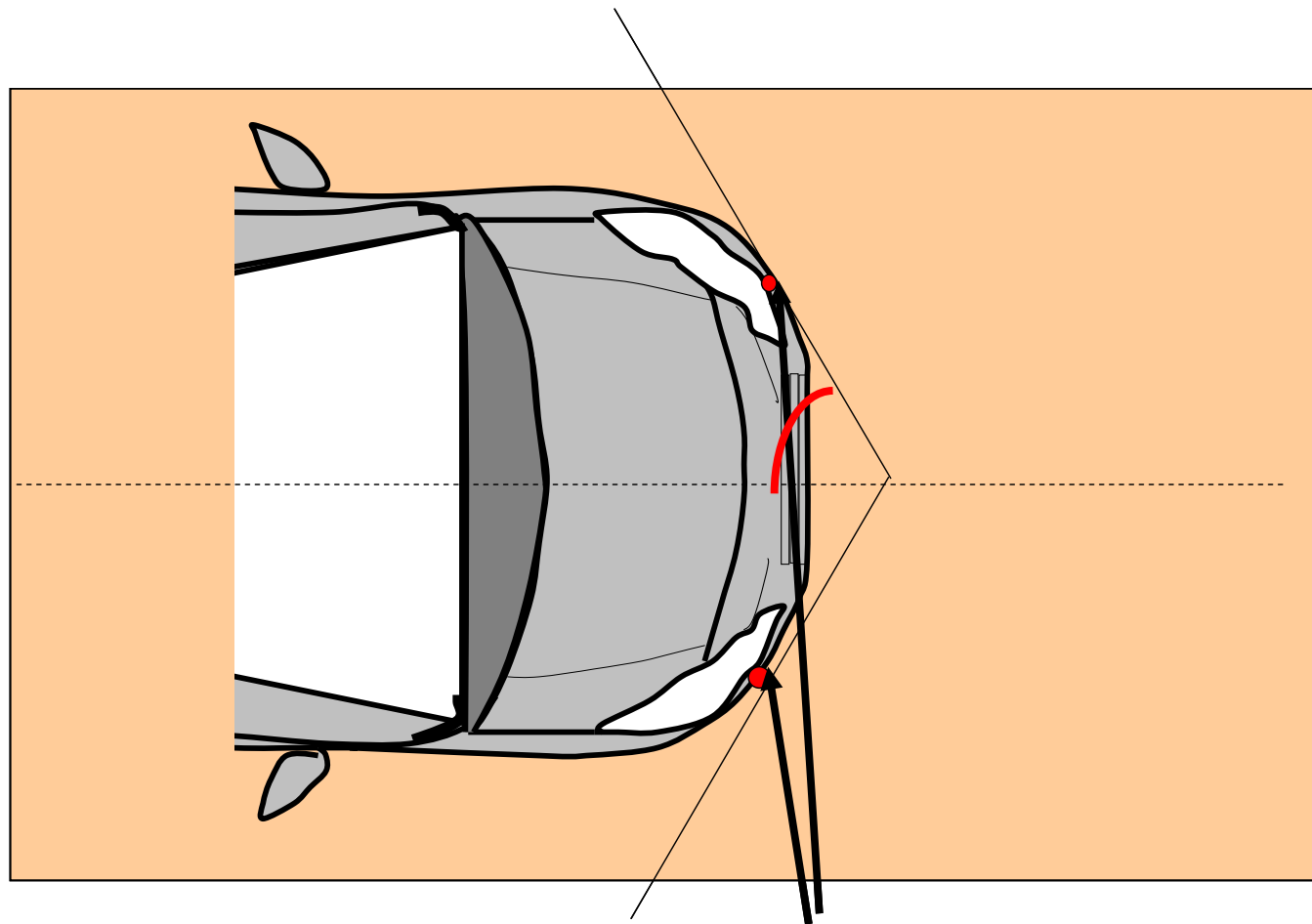
**NTSEL**

**Shunsuke Takagi**

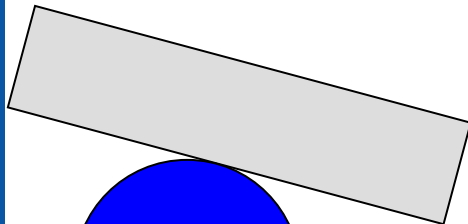


**National Traffic Safety and  
Environment Laboratory**

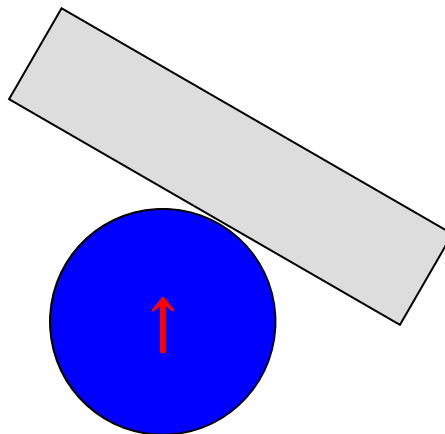
## Determination of Test Area



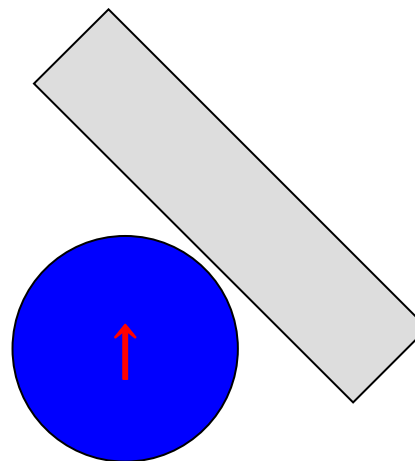
Test area is determined based on 60° contact point.



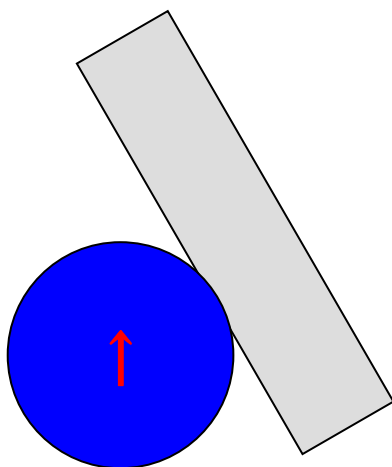
75 degrees



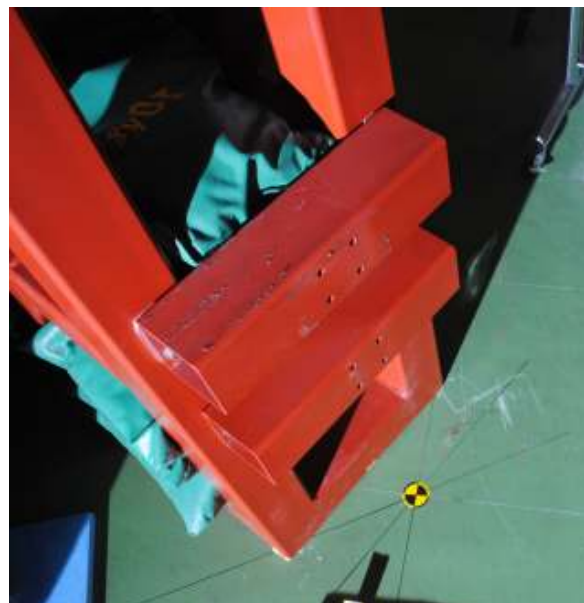
60 degrees

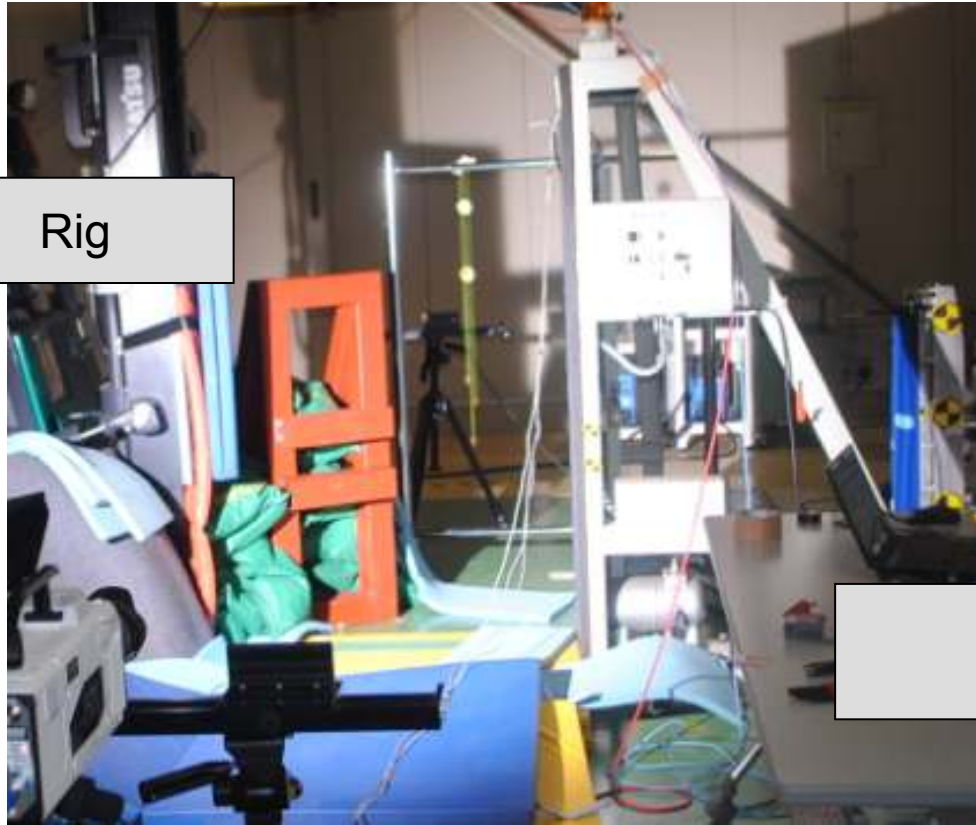


45 degrees



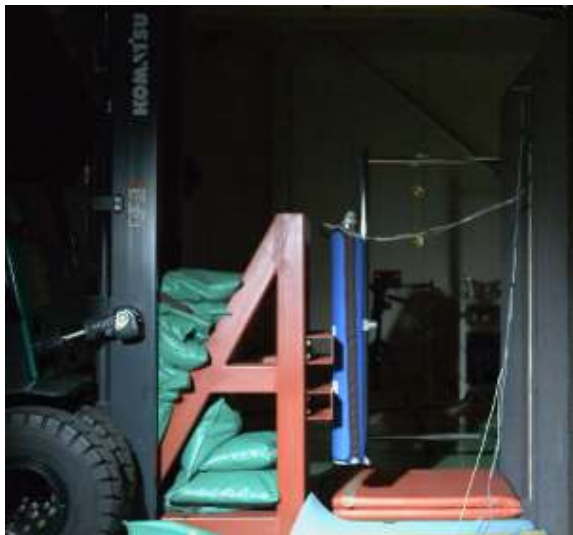
30 degrees





Rig

Impactor



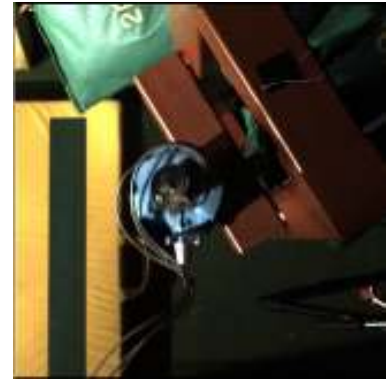
<75 degrees>

< 60 degrees>

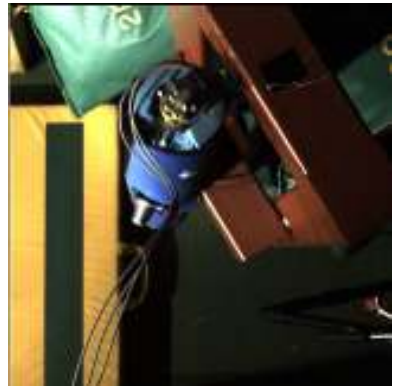
< 45 degrees>

<30 degrees>

0 ms



10 ms

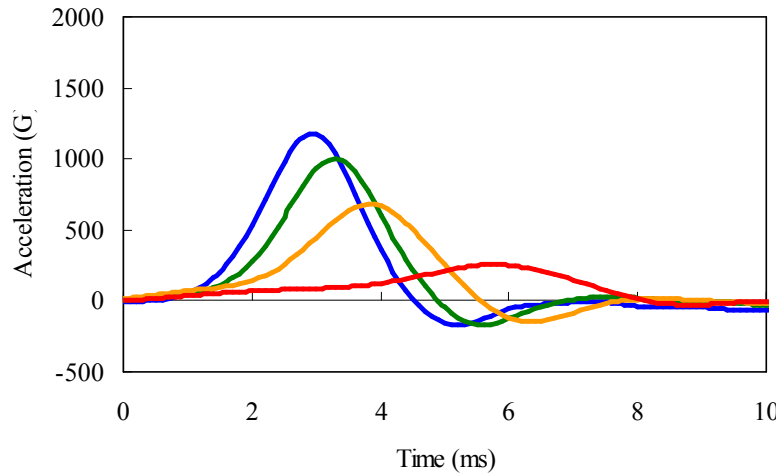


20 ms

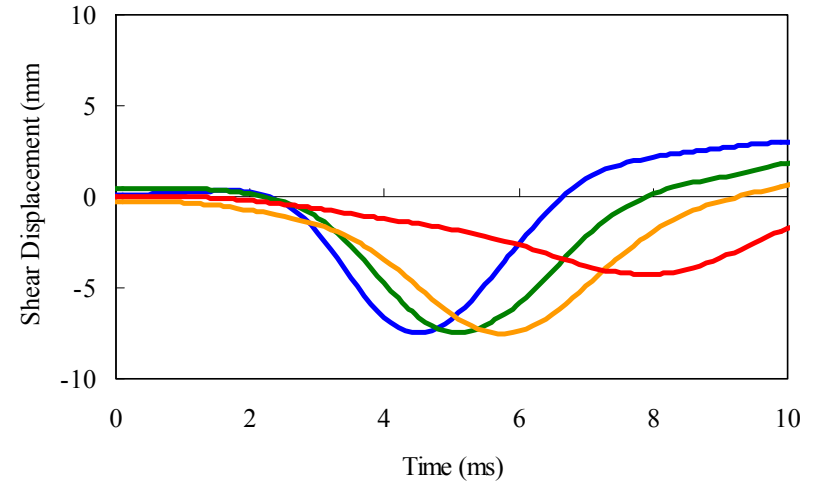


— 75 degrees 
 — 60 degrees 
 — 45 degrees 
 — 30 degrees

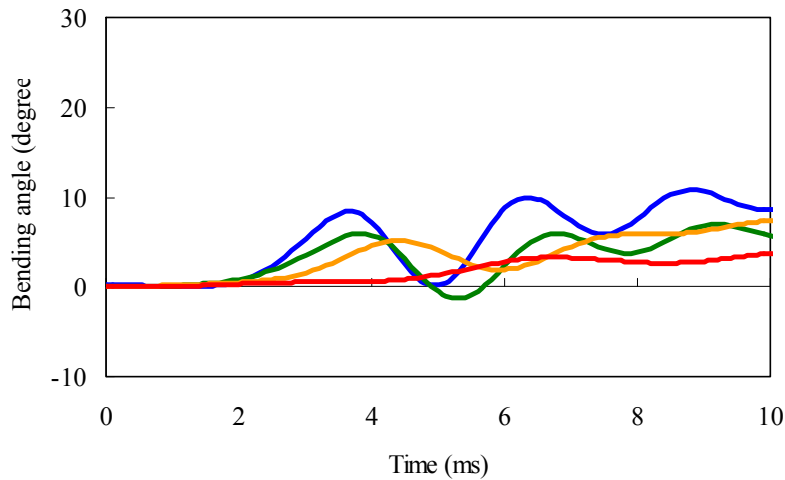
<Acceleration>



<Shear displacement>



<Bending angle>



Acceleration data for 75 degrees reached saturation during measurement.

## <Test conditions and results>

Impact angle	Velocity	Deviation		Temp.	Humidity	Acceleration	Shear displacement	Bending angle
(degree)	(km/h)	(mm)		(degrees Celsius)	(%RH)	(G)	(mm)	(degree)
75	39.6	Down	6	19.8	32.8	- (1174)	7.5	10.8
60	39.7	Down	0	20.0	23.5	1002	7.5	7.0
45	40.4	Down	0	20.4	24.7	669	7.5	7.4
30	39.5	Up	7	20.3	25.3	253	4.3	3.7

# Conclusions

- **We conducted tests using an EEVC impactor at different impact angles.**
- **We found that the waveforms varied with the different impact angles. But it is unclear as to whether the changes in injury values are identical to the influence on the human body.**
- **When using an EEVC impactor, we need to give consideration to expansion of the test area.**