



INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS

# Headform tests Data

16-19 January 2006

Pedestrian Safety GRSP Informal Group January 06



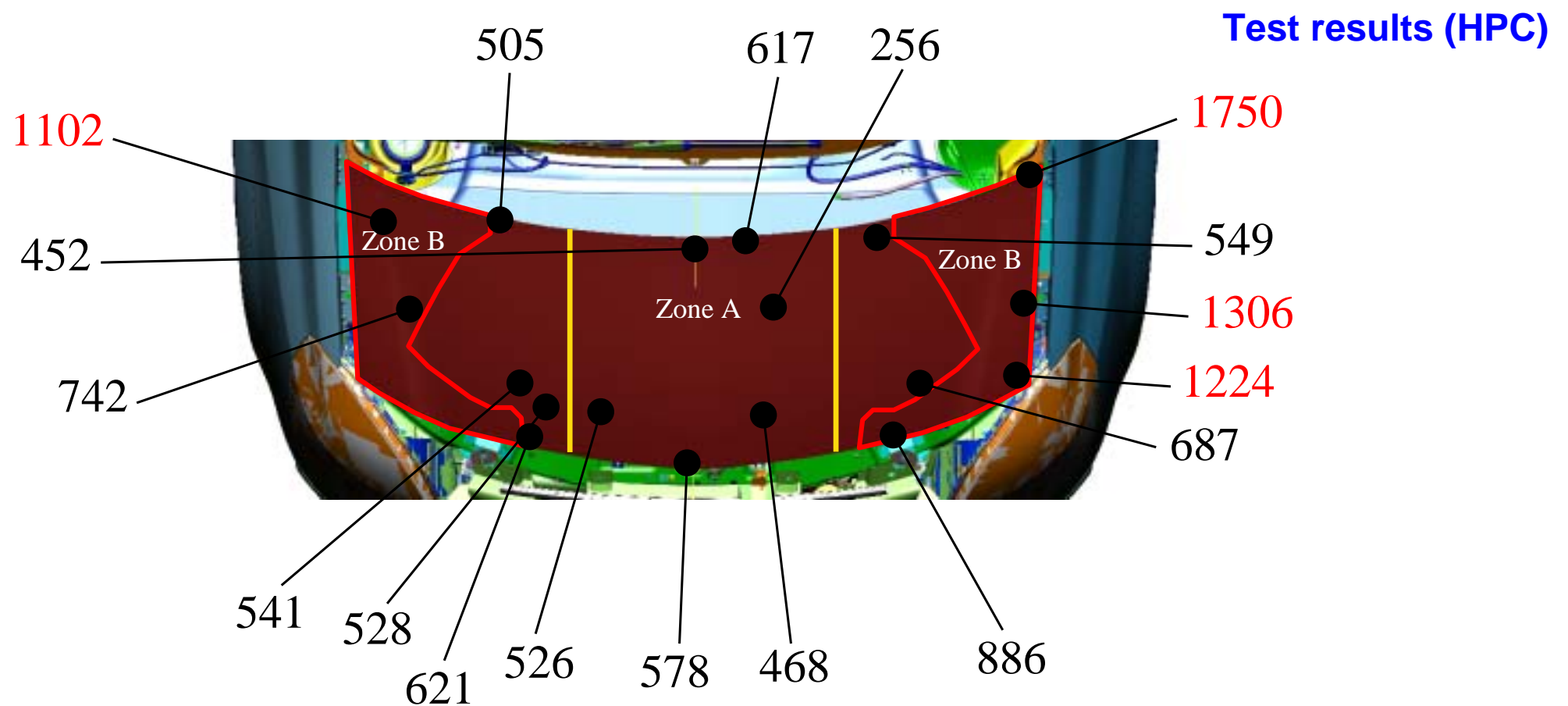
# Car 1: Designed and approved to EU Directive 2003/102/EC Phase 1

No adult test area

Impactor child/small adult 3.5 kg

Impact angle 50° to the horizontal

Impact speed 35 km/h.

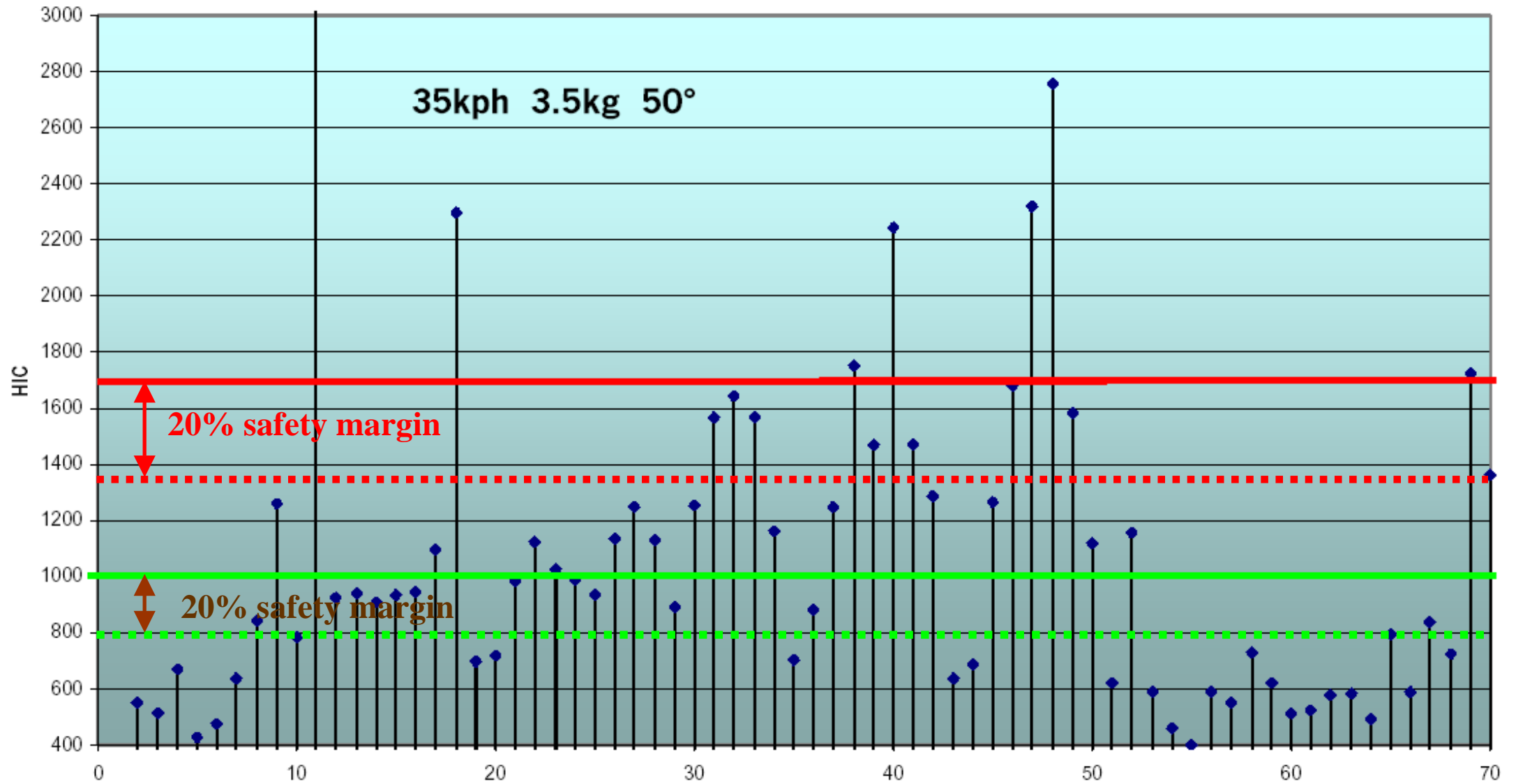




## Car 2: Sports car

**NOT approved to EU Directive 2003/102/EC Phase 1**

**70 impact points tested**





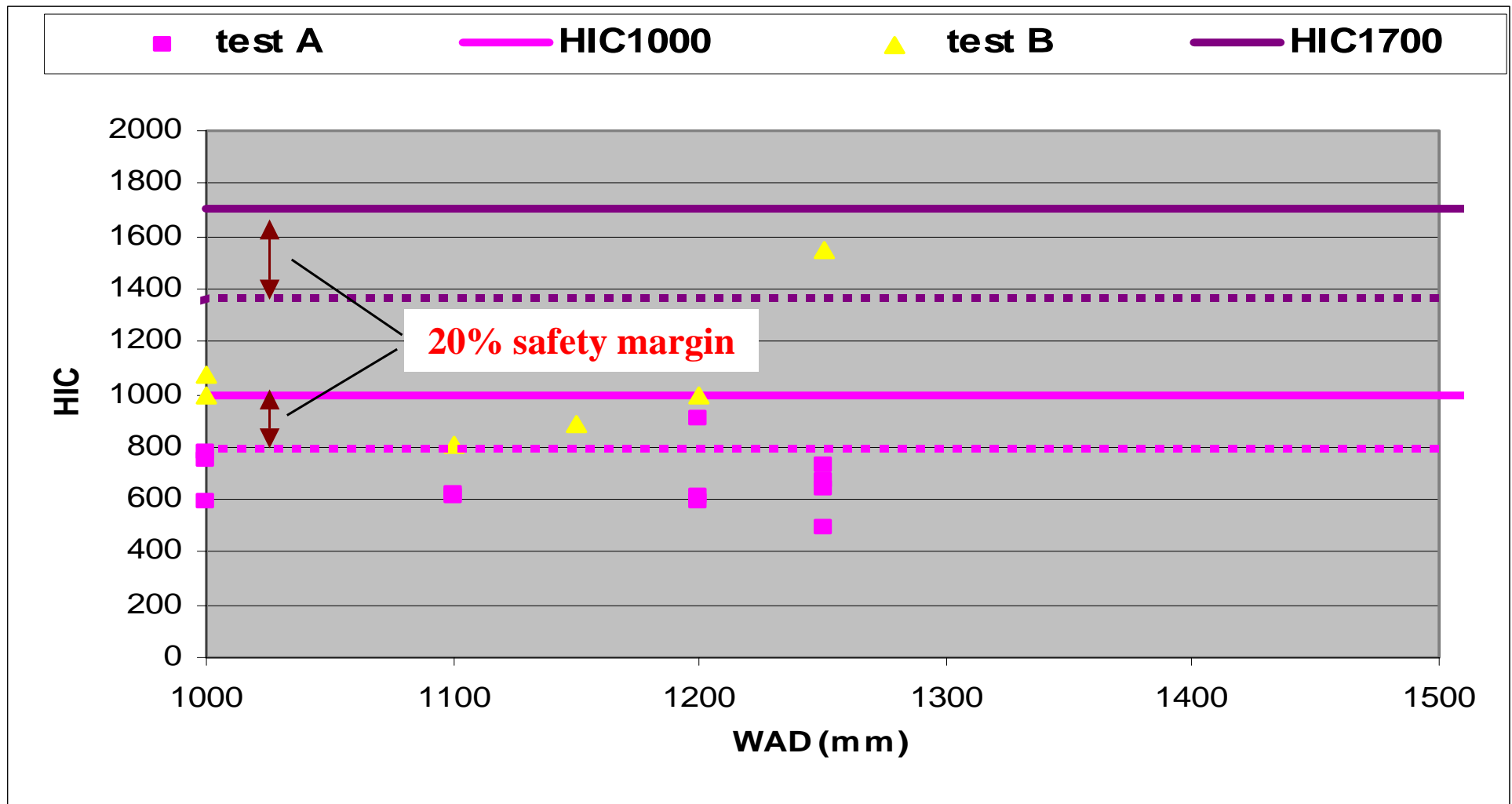
# Car 3: Designed and approved to EU Directive 2003/102/EC Phase 1

No adult test area on bonnet

Impactor child/small adult 3.5 kg

Impact angle 50° to the horizontal

Impact speed 35 km/h.





## Car 4

### Bonnet designed for EU Phase I

#### test results

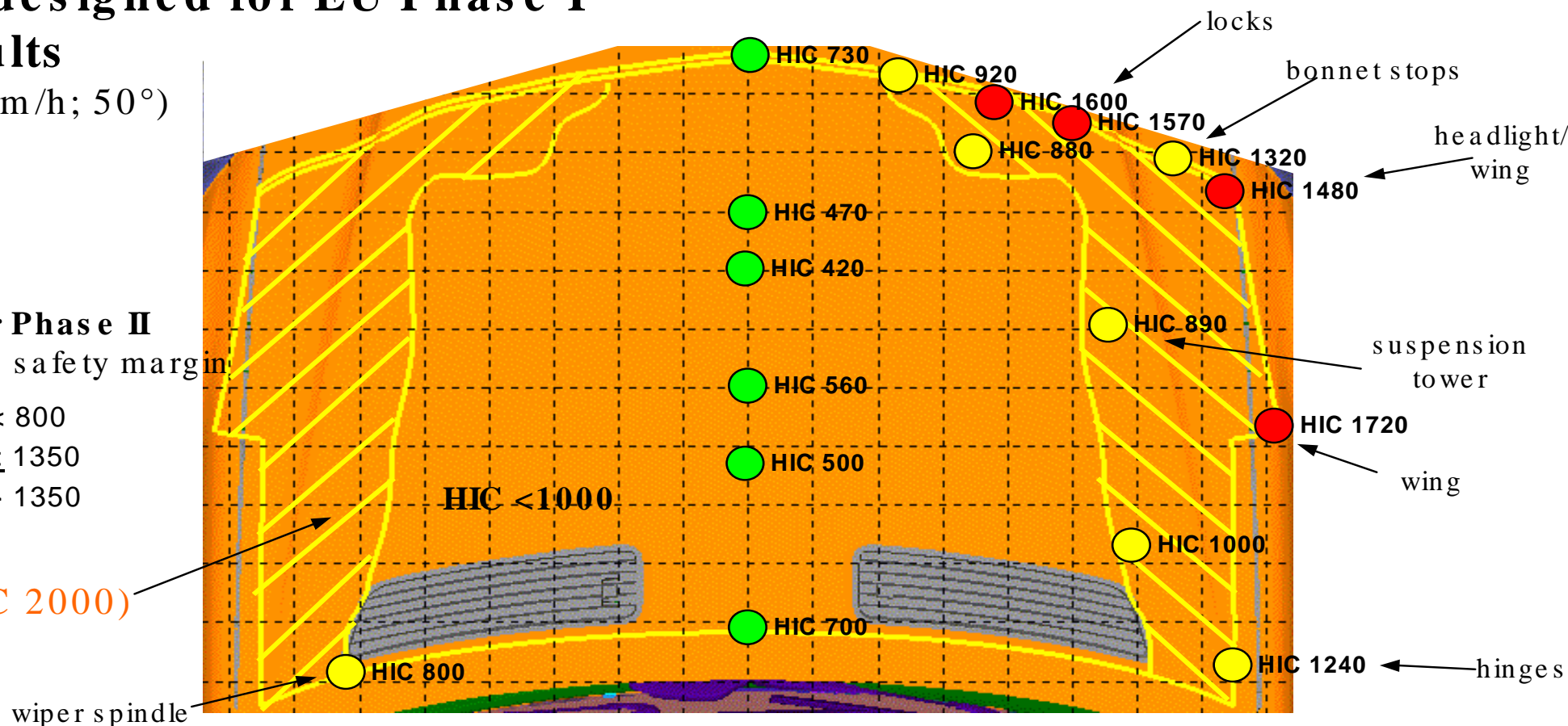
(3,5kg; 35km/h; 50°)

#### HIC limits for Phase II

Including 20% safety margin

- HIC < 800
- 800 ≤ HIC ≤ 1350
- HIC > 1350

33% (HIC 2000)



- **The need for 1/3 zone on the complete bonnet area is due to feasibility** (conflicting requirements for locks, bonnet stops, ...) and will not be changed for Phase II
- **The head impact protection will improve due to more stringent HIC 1700** (actual values will be much lower due to 20% safety margin and need for transition zone)



## **EuroNCAP Phases 10 to 11+ (see INF GR/PS/45)**

- **39 vehicles tested in total**
- **EuroNCAP test conditions different from EU Phase 1, but interpolation indicates that for child headform:**

**Vehicle 1: about 67% (2/3) of the area would meet HPC 1000**

**about 33% (1/3) of the area: HPC 1000 to 2000**

**Vehicle 2: about 10% of the area would meet HPC 1000**

**about 50% of the area: HPC 1000 to 2000**

**about 40% of the area: HPC above 2000**



## **Remarks and conclusions:**

- 1. Only brand new models, specifically designed to meet the requirements can pass**
- 2. Existing models cannot be made compliant**
- 3. Even the best vehicles need the HIC 1700 exemption for compliance**
- 4. Because of high scatter of the test results, manufacturers need safety margin, usually 20% below legal limit**
- 5. Meeting the GTR requirements in the framework of vehicle type approval is clearly a significant challenge**

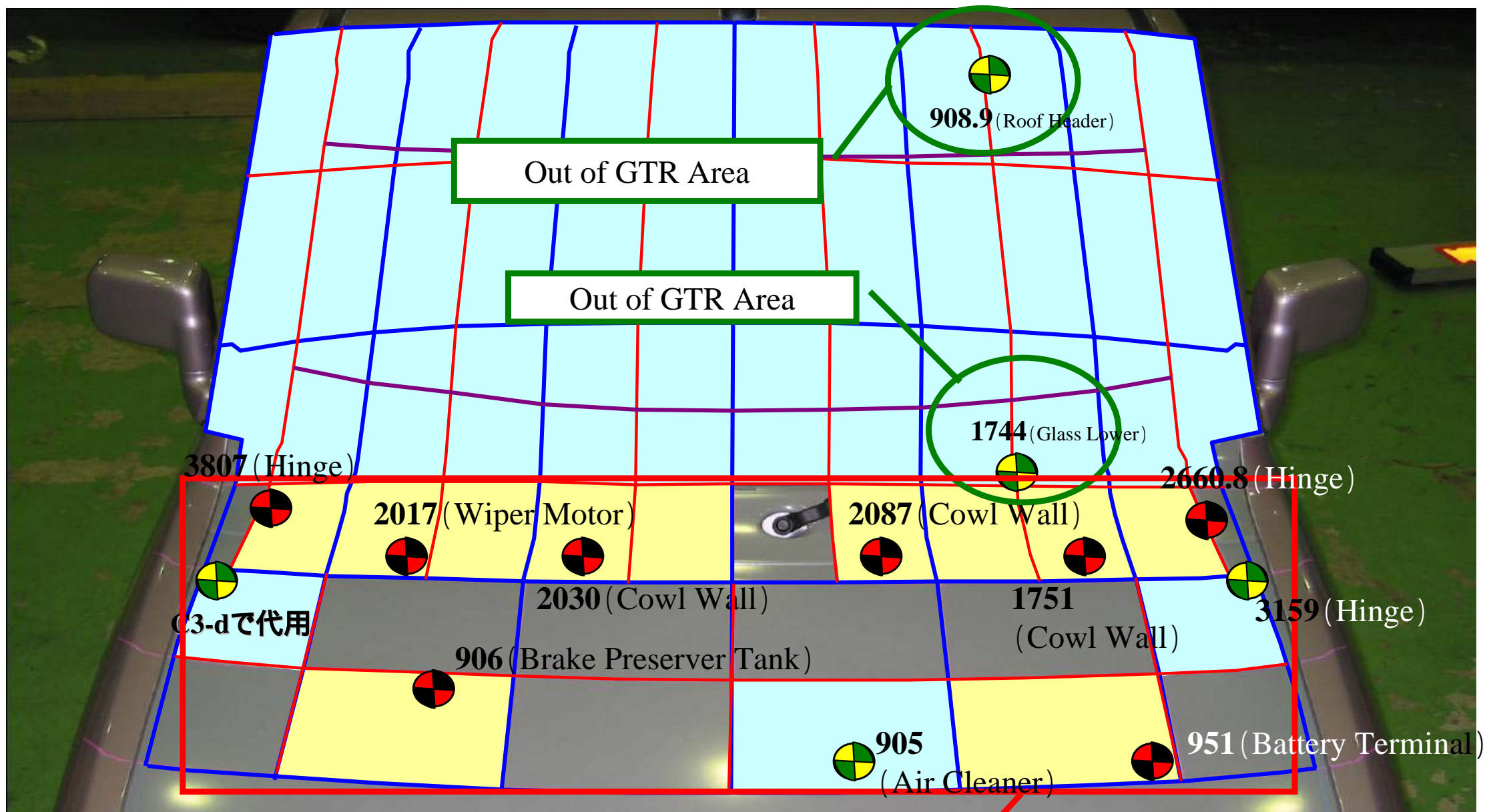
HEADFORM IMPACT TEST RESULTS  
ON BONNET TOP FROM J-NCAP 1<sup>st</sup> YEAR

Jan. 16 -19, 2006 in Washington, D.C.

JAMA



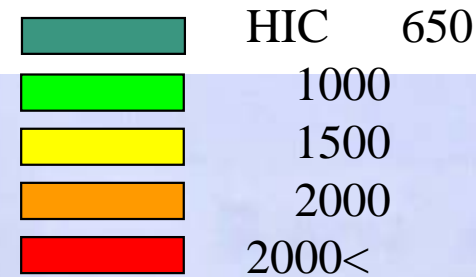
# Example of J-NCAP '03 Impact Points



This report studies data on only GTR area

# EXAMPLE of J-NCAP TEST RESULTS

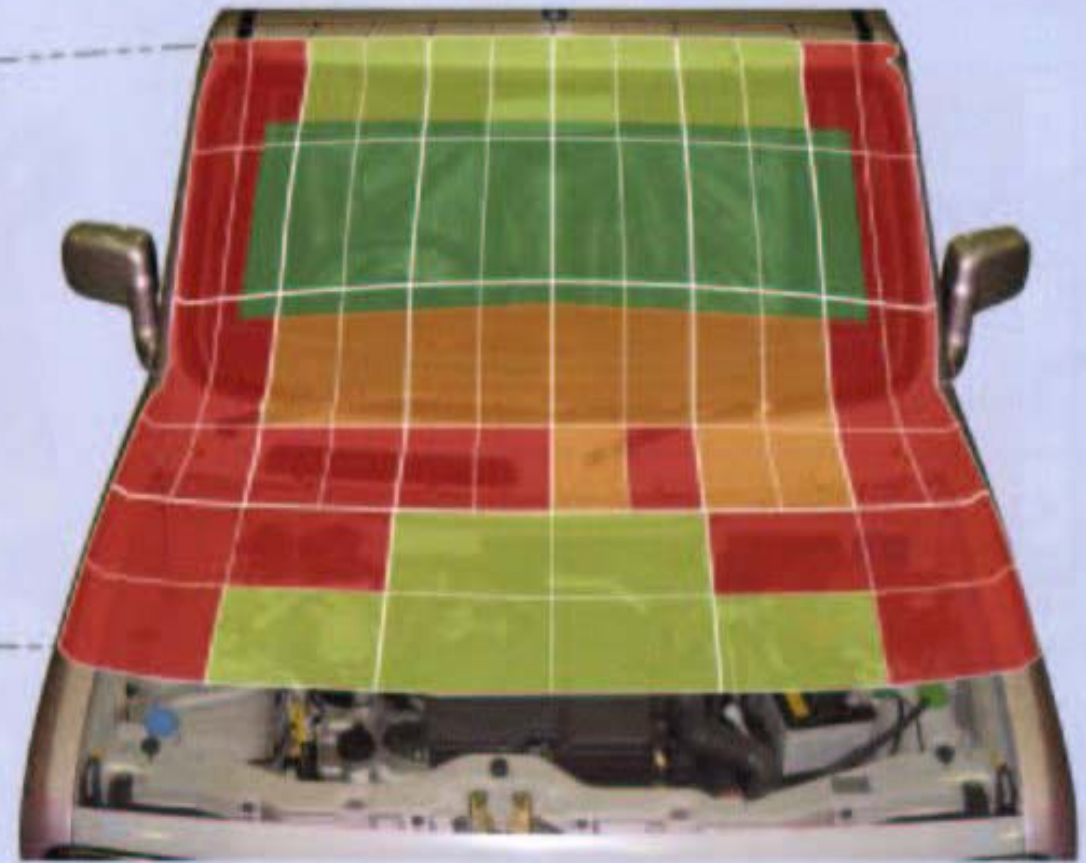
- Total area, WAD1000-2100 is divided into 60 areas.
- Each area has each HIC value from impact test or from neighbor area assuming as same, excluding glass and A pillar area where HIC is given 650 or 2000 by decision based on the experience.



Result: Level 1

WAD2100	I	0.00	0.00	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.23	0.00	0.00
WAD1900	平均 得点	1.00		3.65		3.63		3.63		3.65		0.98	
	2.76	0.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	0.00
WAD1700	II	0.00	0.00	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.00	0.00
WAD1625	平均 得点	0.14		1.01		1.14		1.35		1.38		0.16	
	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.74	0.74	0.00	0.00
WAD1350	III	0.00	0.00	3.24		3.24		0.00		0.00		0.00	
WAD1175	平均 得点	0.81		3.24		3.24		3.24		3.11		0.78	
	1.61	0.00	3.24	3.24	3.24	3.24	3.11	3.11	3.11	3.11	3.11	0.00	0.00
WAD1000													

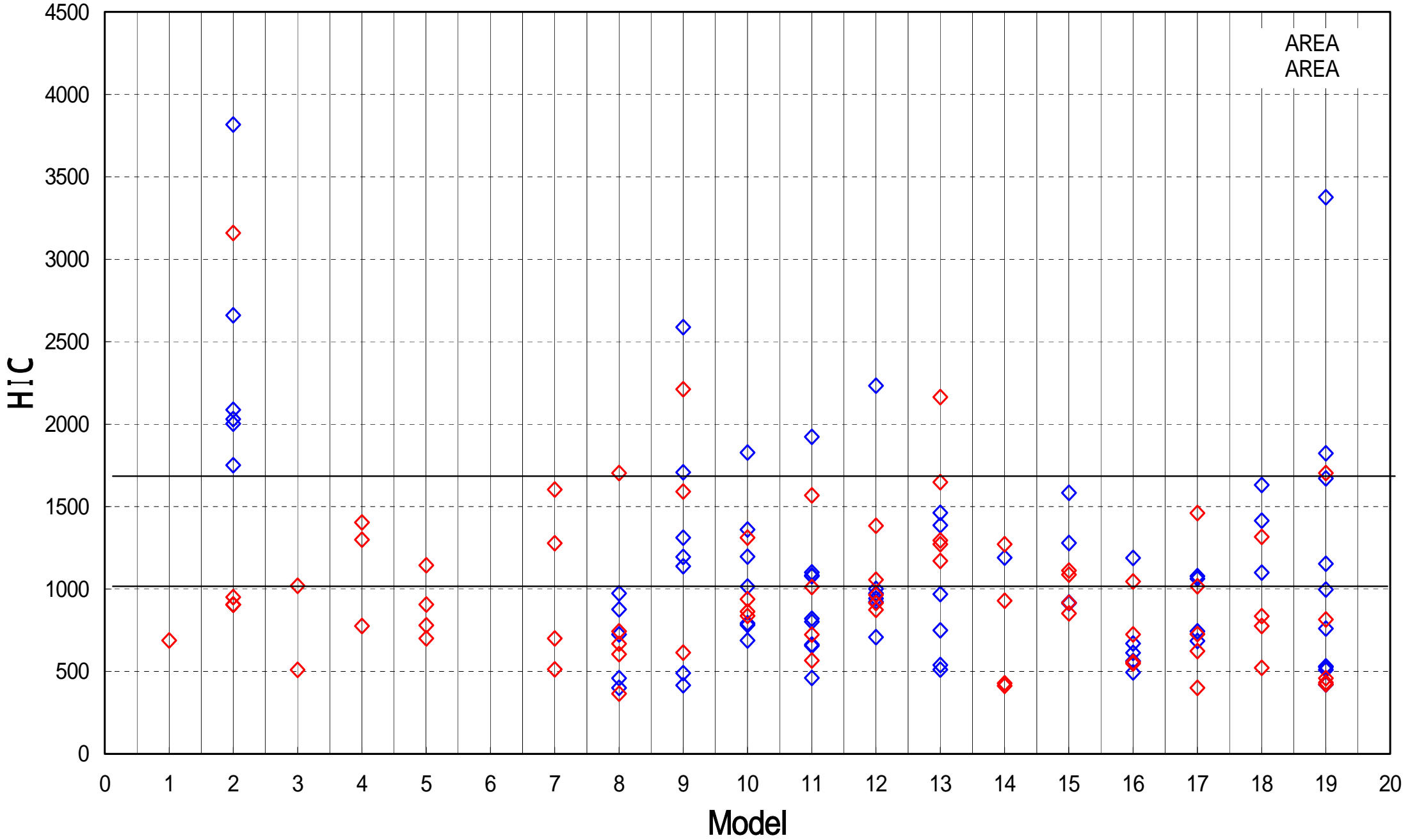
Total Point: 1.74



# HIC Distribution of Impact Points on GTR Area

Total Impact Points

1 10 2 3 4 0 4 10 10 11 13 11 11 5 8 9 9 7 15



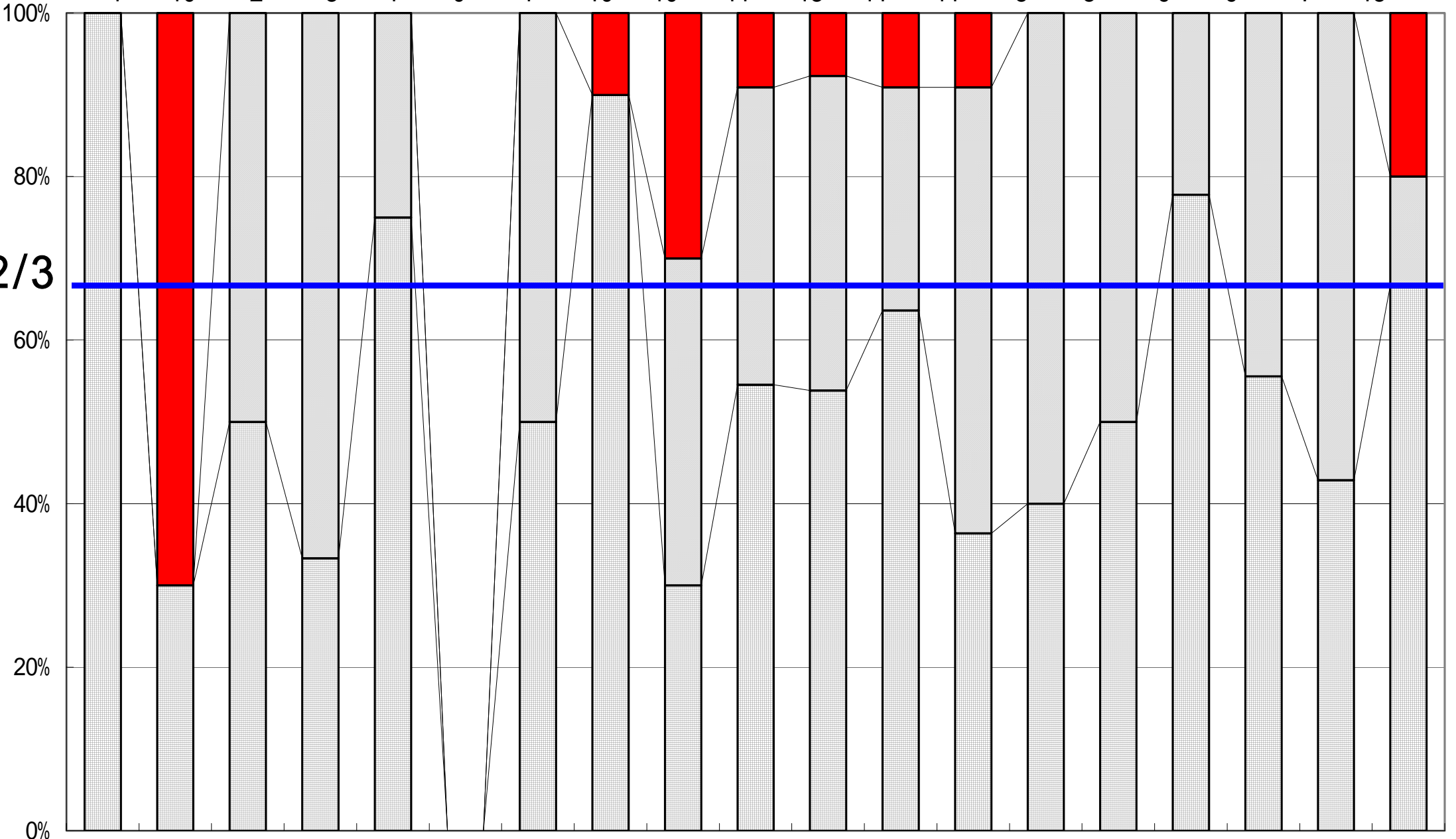
Distribution of HIC Range by Impact Point [ <1000<1700< ]

Total Impact Points

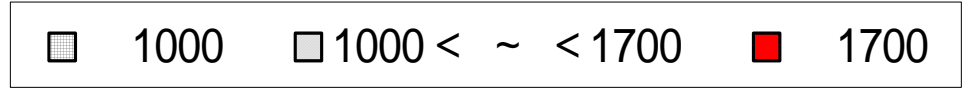
1 10 2 3 4 0 4 10 10 11 13 11 11 5 8 9 9 7 15

HIC Range Distribution

2/3



Model

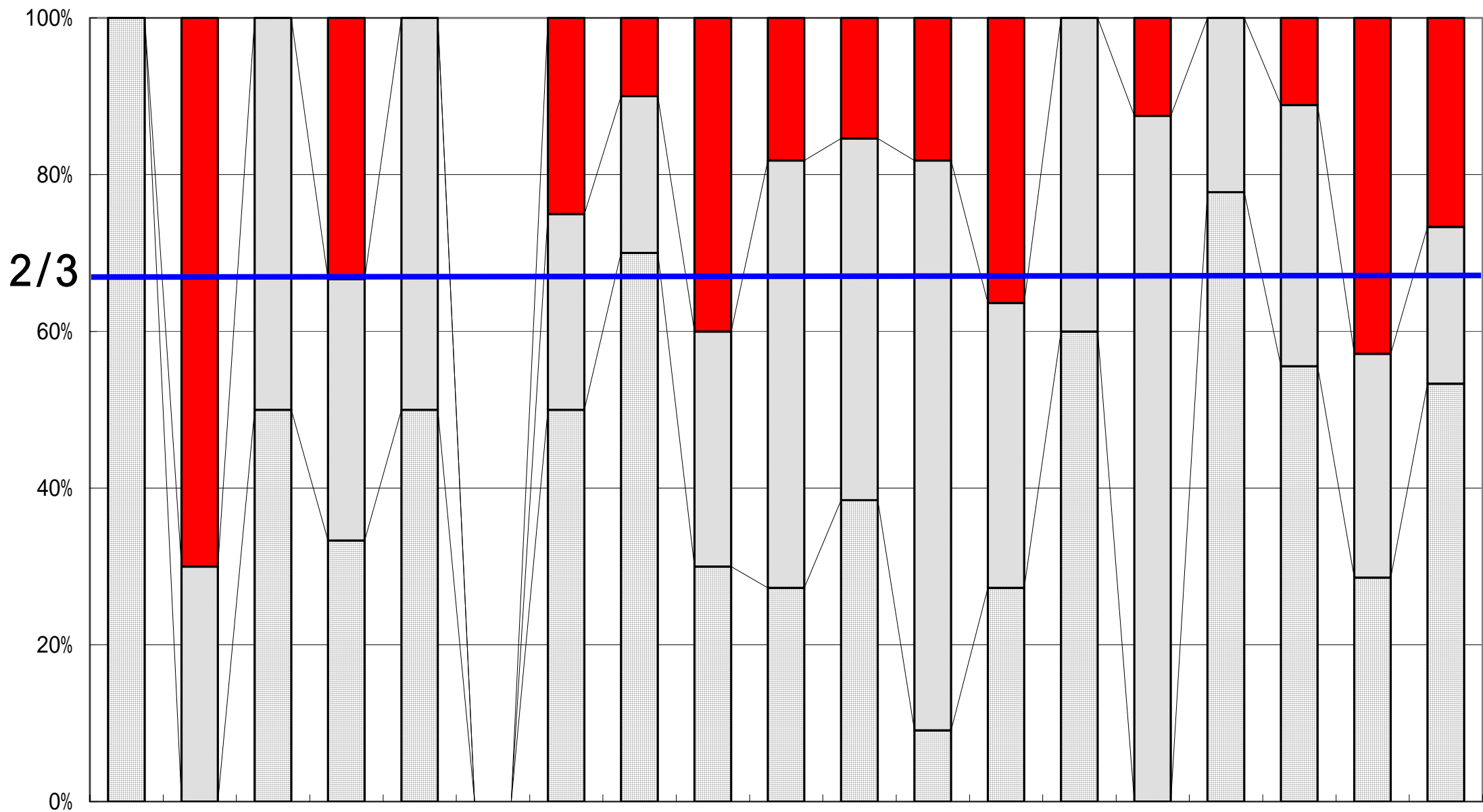


# Distribution of HIC Range by Impact Point [ <800<1360< ]

Total Impact Points

1 10 2 3 4 0 4 10 10 11 13 11 11 5 8 9 9 7 15

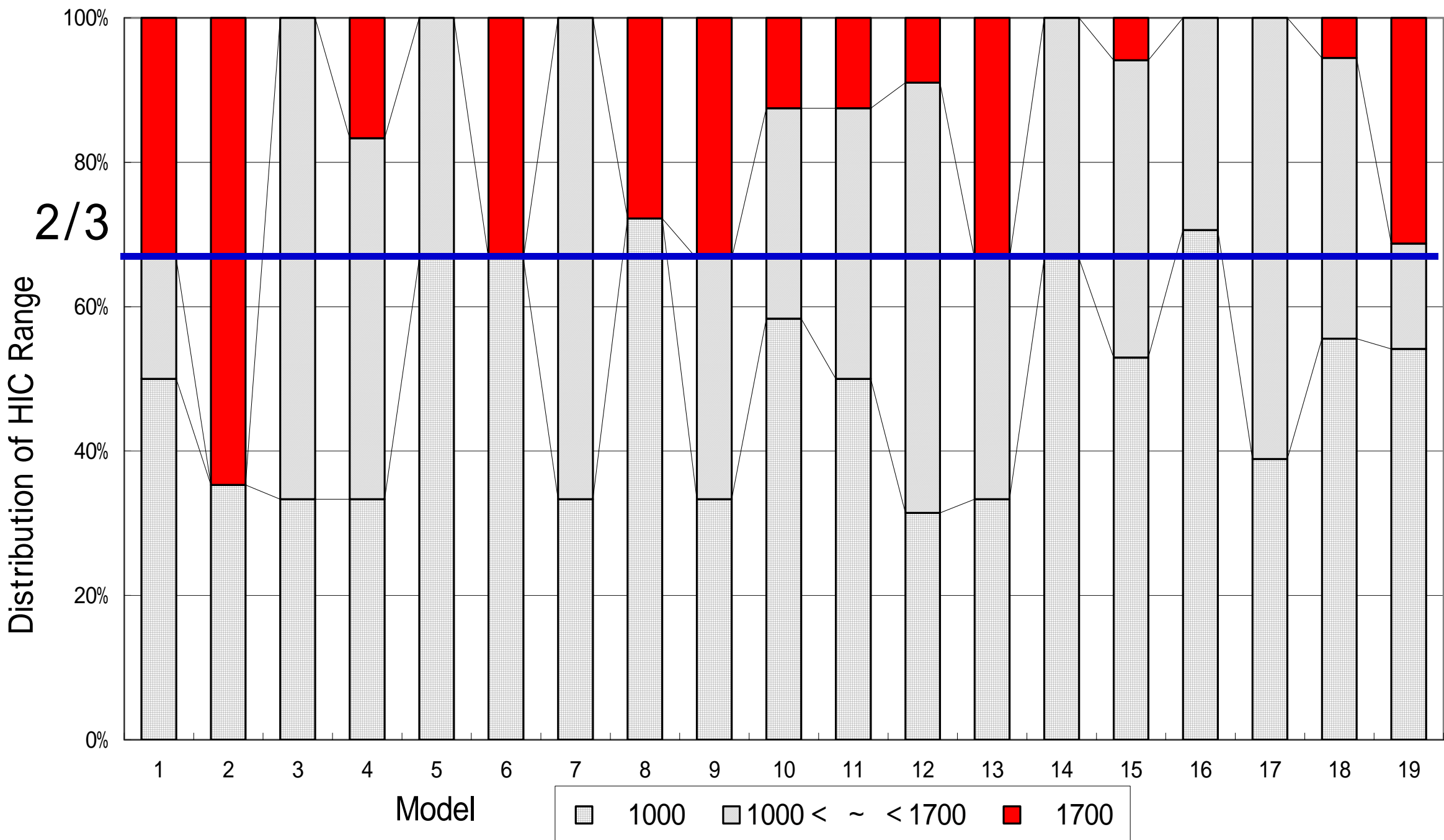
HIC Range Distribution



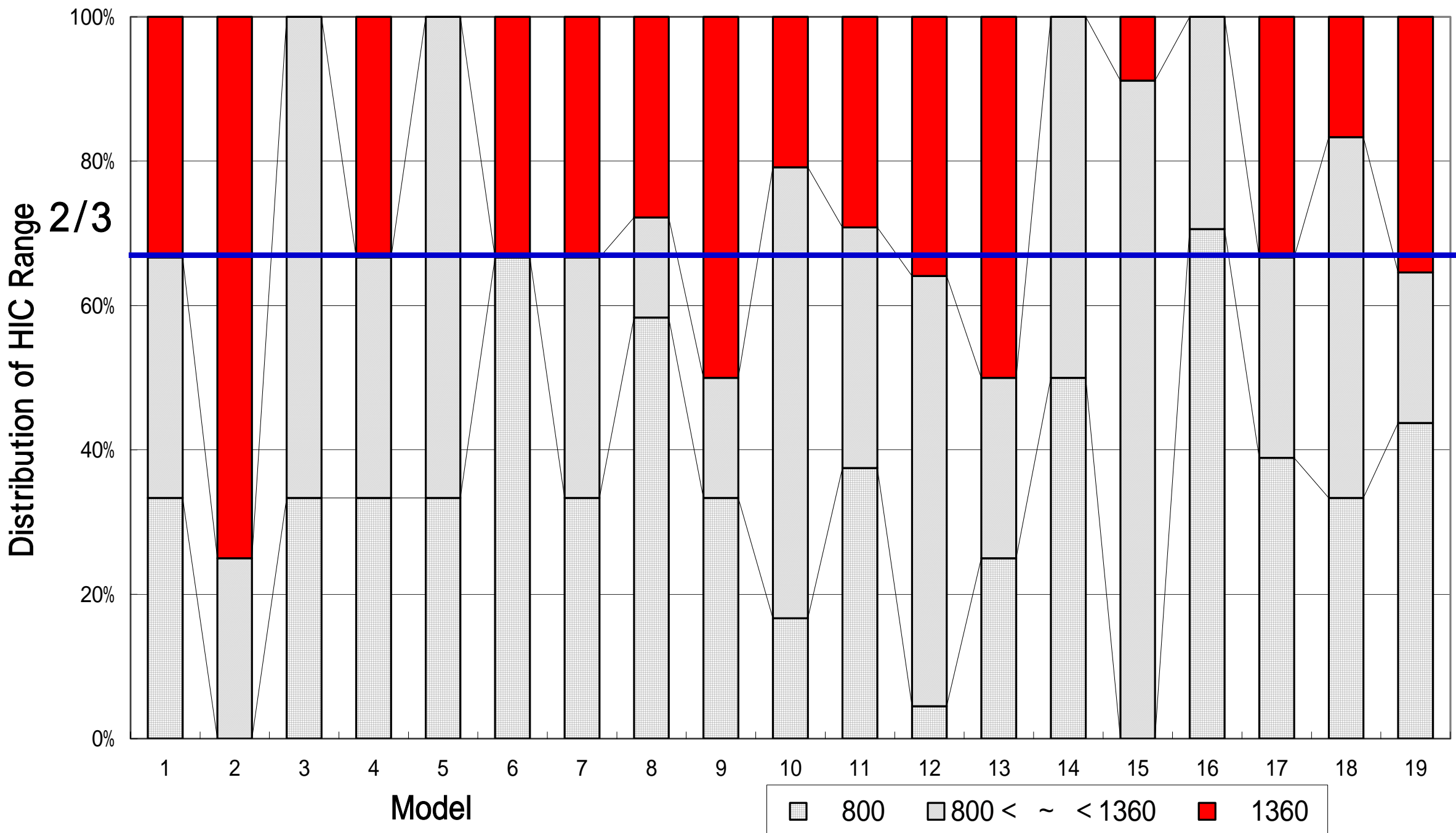
Model

800
  800 < ~ < 1360
  1360

Distribution of HIC Range by Number of Areas [ $<1000<1700<$ ]



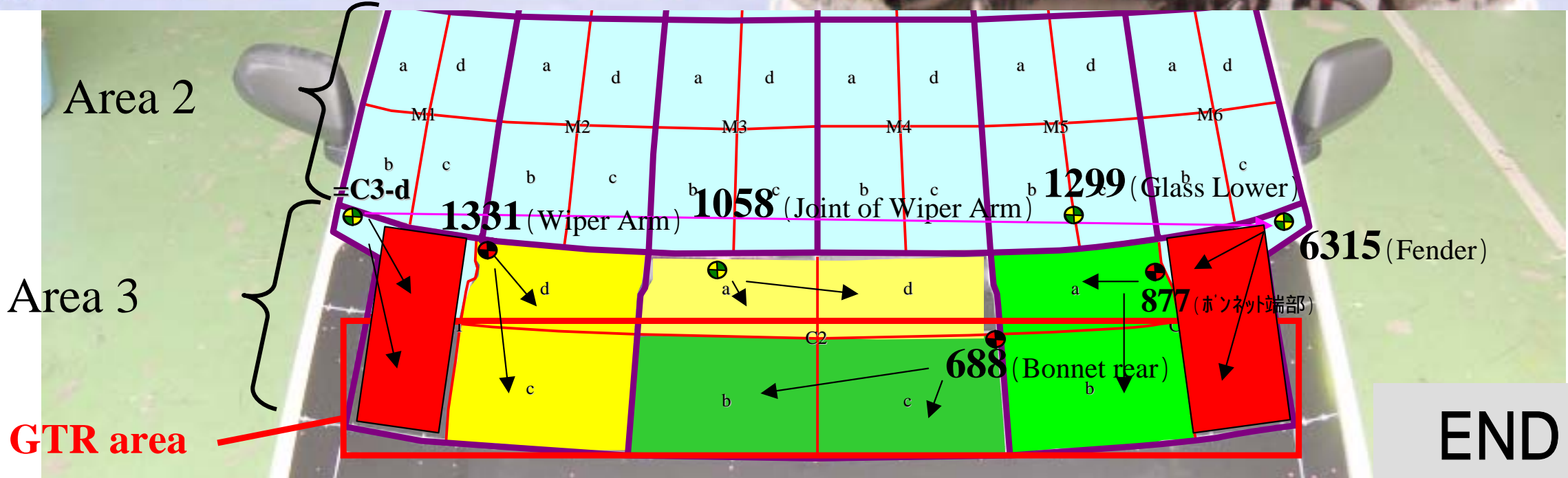
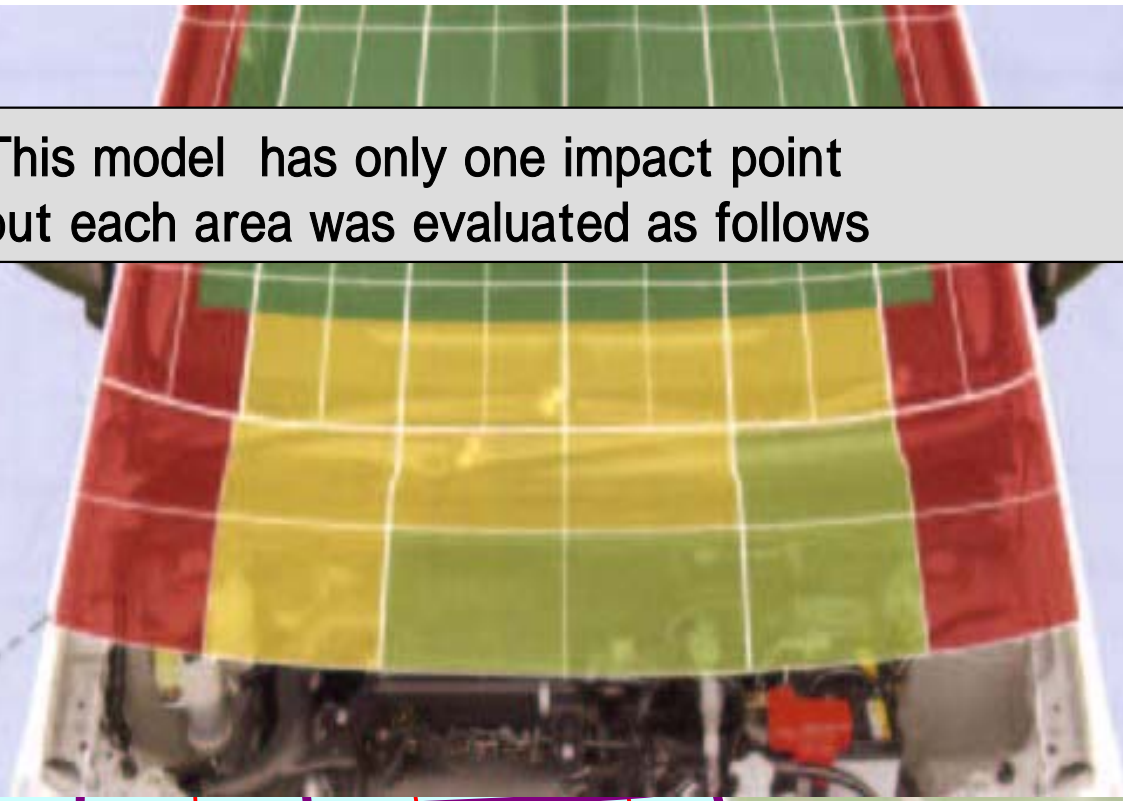
Distribution of HIC Range by Number of Areas [ <800<1360< ]



# Example of J-NCAP: Model # 1

WAD2100		0.00	0.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	0.00	0.00
WAD1900	I	1.41		4.00	4.00	4.00	4.00	4.00	4.00	4.00		1.40	
	平均	3.14		4.00	4.00	4.00	4.00	4.00	4.00	4.00		4.00	0.00
WAD1700		0.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	0.00	
WAD1525	II	0.90		3.17	3.16	3.16	3.16	3.16	3.17	3.17		0.90	
	平均	2.41		2.08	2.08	2.08	2.08	2.08	2.08	2.08		2.08	0.00
WAD1350		0.00	1.98	2.79	2.79	2.79	2.79	3.33	3.33	3.33	0.00	0.00	
WAD1175	III	0.99		3.34	3.34	3.34	3.34	1.67	1.67	1.67		1.67	
	平均	2.00		1.98	3.89	3.89	3.89	3.33	3.33	3.33		0.00	0.00
WAD1000		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

This model has only one impact point but each area was evaluated as follows



END