

**Ministry of Transportation and
Communications**

**Taiwan New Car Assessment Program
(TNCAP)**

Second Version

1.2 Overall Rating

V2.0
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1.2.1 Overall Rating Calculation

The overall rating is composed of scores achieved in the four areas of assessment, also referred to as “boxes”: Adult Occupant, Child Occupant and Vulnerable Road User Protection and Safety Assist. The score in each box is based on the car performance in different tests.

1.2.1.1 For each box, a total score is normalized with respect to the maximum achievable score available for the box. In this way, the maximum score for each box, and hence the total maximum score, is a constant.

1.2.1.2 The weighted overall score is calculated from the individual assessment scores using weight factors. The weighted overall score, determined by taking the weighted average of the scores in the four boxes, is only used to rank cars for determining the best in class vehicles at the end of each year. These weight factors reflect the relative importance of the four.

1.2.1.3 Vehicles that show a poor performance in one of the boxes will have their star rating restricted to show that they do not provide good all-round protection. There will be a minimum score required in each box to validate a star rating. See Figure 1 for a flow diagram of the method of calculation of the overall star rating.

1.2.2 Weight Factors and Balance Criteria

1.2.2.1 TNCAP shall consider the promotion goals and priorities of each stage, the weight factors are fixed but may be updated from time to time as priorities or the contents of the boxes change, and the best model of the year will be selected based on the number of rated models in the same class. Table 1 summarizes the weight factors applied in the upcoming period.

1.2.2.2 Balance criteria are applied to the individual box scores in order to assess all-round performance. The limits given in Table 2 is applied after the individual test scores have been rounded.

Table 1: Weight factors

	Adult Occupant Protection	Child Occupant Protection	Vulnerable Road User	Safety Assist
Weight factors	40%	20%	20%	20%

Table 2: Balance limits

	Adult Occupant Protection	Child Occupant Protection	Vulnerable Road User	Safety Assist
5 stars	80%	80%	60%	70%
4 stars	70%	70%	50%	60%
3 stars	60%	60%	40%	50%
2 stars	50%	50%	30%	40%

1 stars	40%	40%	20%	30%
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1.2.2.3 A vehicle that meets all of the balance criteria for a 5-star overall rating cannot have any critical red body region (after modifiers are applied). In case of a red critical body region, the vehicle is limited to a maximum of 4-stars.

This prerequisite for 5-star overall ratings is applied to all official full scale tests performed by TNCAP:

Table 3: Full scale tests and critical body regions

Full scale tests	critical body regions
Frontal ODB	Head & Neck and Chest
Frontal FW	Head, Neck (driver only) and Chest
Side MDB	Head, Chest, Abdomen and Pelvis
Side Pole	Head, Chest, Abdomen and Pelvis

1.2.3 Rounding

The following rounding rules will be applied in the calculation of the overall rating.

- (1) Data is entered to 2 decimal places.
- (2) Intermediate calculations (e.g. calculations needed to derive parameters which are then used to calculate scores) are not rounded.
- (3) Calculation of points scores (e.g. for individual body regions) are rounded to 3 decimal points e.g. a head score of 3.1238 in frontal impact would be rounded to 3.124.
- (4) The total points score in each box is the sum of scores rounded to 3 decimal points. To calculate the percentage score in each box, the 3 decimal points total is divided by the maximum points available for that box and the resulting percentage is rounded down to the nearest integer. In the example case: $25.124 / 36 * 100\% = 69.789$ is rounded to 69%.
- (5) That integer is then compared with the balance percentage thresholds for the box in Table 3.3. In the example case, 69% qualifies for 3 stars AOP.

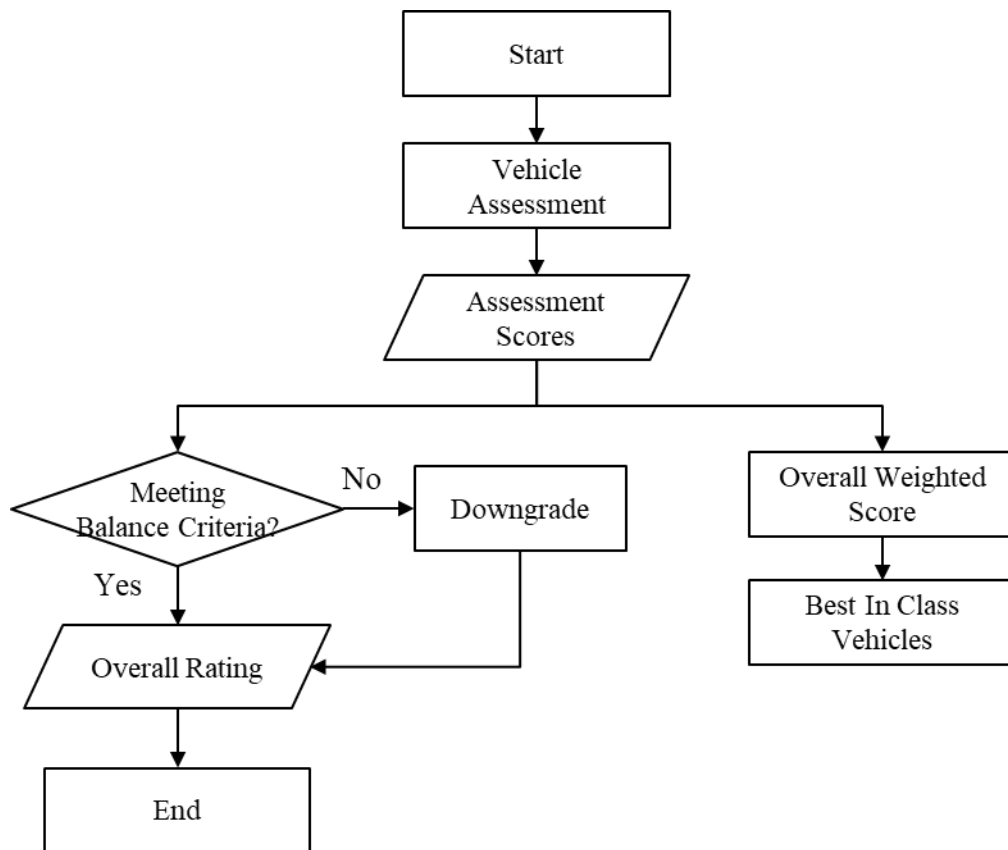


Figure 1: Flowchart for the Calculation of the Overall Star Rating