

WardsAuto World Industry Study

Sponsored by DuPont and conducted
by Paramount Research



Table of Contents

- Introduction1**
- Methodology.....1
- Project Management1
- Response Rate2
- Respondent Profile.....3**
- Type of Business3
- Job Title4
- Key Findings5
- Standards Expectations after Mid-term Reviews6
- Reasons Contributing to Relaxed Standards7
- Potential Regulation Change Impact8
- Programs Impacted9
- Value of Lightweighting10
- Weight Reduction Interest.....11
- CAFE Fuel Economy Standards12
- Mass Reduction Focus13

Introduction

Methodology

This study was conducted using an online research methodology. *WardsAuto World* provided Paramount Research with a list of automotive professionals. A total of two e-mail invites were sent to the subscribers asking for their participation. A random drawing for a \$100 cash prize was offered as an incentive to boost response. All e-mail contacts include an opt-out link allowing respondents to remove themselves from the study. In total, the survey remained open for two weeks.

Project Management

All aspects of this research project were under the sole control of Paramount Research. These duties include:

- Survey development and hosting
- Sample selection
- Data collection
- Data analysis
- Report writing and production

Response Rate

1,326 surveys were completed, resulting in an effective response rate of four percent.

As an incentive to increase study response, each survey respondent was entered into a random drawing for a \$100 cash prize. The survey invite reached 36,127 industry professionals and 1,326 completed the survey.

| Sample Statistics | | |
|-------------------|--|--------|
| A. | Industry professionals who received an e-mail invite | 36,127 |
| B. | Completed surveys | 1,326 |
| C. | Effective response rate (B/A) | 4% |

Respondent Profile

Type of Business

The largest segment of respondents works for a systems/components/parts manufacturer.

More than four in ten of the respondents (43%) indicated they work for a systems/components/parts manufacturer. Another one in four (24%) indicated vehicle manufacturer.

| Type of Business | % Indicating |
|--------------------------|--------------|
| Systems/Components/Parts | 43% |
| Vehicle Manufacturers | 24% |
| Engine/Engine Services | 6% |
| Other | 27% |

Base = Those respondents who answered the question or 1,326.

Job Title

More than one in four respondents work in engineering or design.

The largest segment of respondents (26%) work in engineering or design. Another one in six (16%) indicated corporate management.

| Job Title | % Indicating |
|--------------------------------------|--------------|
| Engineering/Design | 26% |
| Corporate Management | 16% |
| Research & Development | 11% |
| Quality, Testing or Reliability | 10% |
| Manufacturing/Production Engineering | 4% |
| Manufacturing/Production Operations | 4% |
| Purchasing | 3% |
| Other | 13% |

Base = Those respondents who answered the question or 1,321.

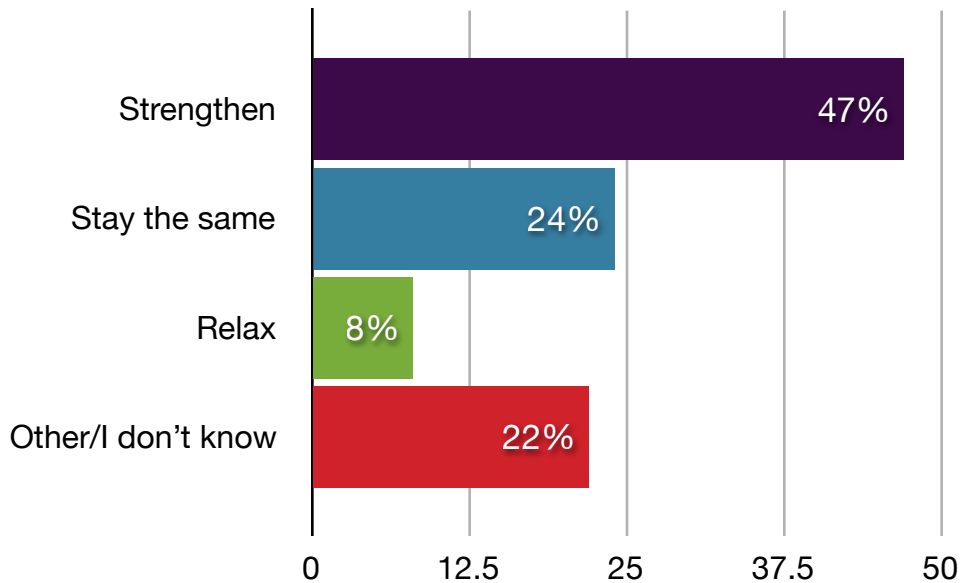
Key Findings

Standards Expectations after Mid-term Reviews

The majority of respondents expect the standards to strengthen or remain the same after the mid-term reviews.

Nearly half of the respondents (47%) indicated that the mid-term review of the 2017-2025 standards will result in strengthened standards. Another one in four (24%) indicated they would remain the same.

➔ The European Commission may postpone a mandate for fleet-wide new-car tailpipe emissions to drop to 95 grams of carbon dioxide per kilometer. In the US, mid-term reviews of the 2017-2025 standards could adjust the fuel economy and emission regulations. Do you expect the standards to:



Base = Those respondents who answered the question or 1,337.

Reasons Contributing to Relaxed Standards

Among those respondents who expect the standards to be relaxed, the most highly rated reasons for their opinion is over concerns that tougher rules would have a negative economic impact and because of cost issues.

When asked to rate reasons why the standards would be relaxed, respondents indicated that a negative economic impact as a result of tougher standards as well as cost issues were the most important reasons for relaxing the standards(4.3 each).

➔ **To what degree do you think each of the following reasons will factor into the decision to relax the standards?**

Mean Importance Rating
(5-point scale where 1 = 'not at all important' and 5 = 'very important')

| Reason | Mean Importance |
|---|-----------------|
| Concerns that tougher rules will have negative economic impact | 4.3 |
| Cost issues | 4.3 |
| Recognition by governments that technical issues will take more time to solve | 3.8 |
| Slow market adoption of electric, and plug-in electric vehicles | 3.4 |
| Waning voter support of green technologies | 3.2 |
| Growing consumer acceptance of higher fuel prices | 3.1 |
| Consumer skepticism about climate change dangers | 3.1 |

Base = Those respondents who expect the standards to be relaxed and rated each reason.

Potential Regulation Change Impact

More than one in three respondents indicated that potential changes to the regulations have impacted at least a few programs they are working on.

One in seven respondents (14%) indicated that potential regulation changes have impacted many of the programs they are working on. Another two in ten (22%) indicated a few programs.

 **Have the potential changes to the regulations impacted any programs you may be working on?**

| Program change | % Indicating |
|----------------------------------|--------------|
| Yes, many programs have changed | 14% |
| Yes, a few programs have changed | 22% |
| No programs have changed | 43% |
| I do not know | 21% |

Base = Those respondents who answered the question or 1,339.

Programs Impacted

Engine efficiency programs were mentioned most often as the program impacted by potential changes to the regulations.

Among those respondents who have had programs impacted by potential changes to regulations, engine efficiency programs (67%) were mentioned most often. More than half (51%) indicated lightweighting and one in three (33%) indicated electric and plug-in vehicles.

➔ **Which programs are impacted?**

| Program | % Indicating |
|---|--------------|
| Engine efficiency programs | 67% |
| Lightweighting | 51% |
| Electric and plug-in electric vehicles | 33% |
| Fuel cell powered vehicles | 16% |
| Bio-fuel programs | 16% |
| Low global warming potential air conditioning refrigerant | 13% |
| Other | 11% |

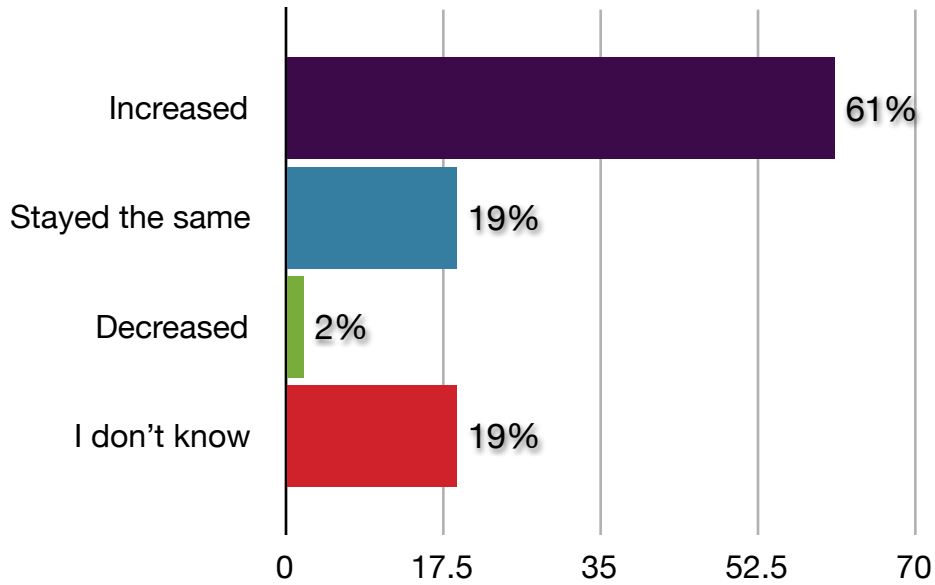
Base = Those respondents who indicated that a program was impacted and who answered the question or 452.

Value of Lightweighting

The largest segment of respondents indicated that the value of “lightweighting” has increased.

Six in ten respondents (61%) indicated that the value of “lightweighting” has increased. Another two in ten (19%) indicated that it has remained the same.

➔ *There is a “lightweighting” component associated with most of the technologies developed to improve fuel economy and reduce emissions. Has the “value” of lightweighting increased, decreased or stayed the same since 2011?*



Base = Those respondents who answered the question or 1,256.

Weight Reduction Interest

Respondents indicated that they think automakers are most interested in reducing weight from chassis and fuel.

When asked how interested they thought automakers were in reducing weight from various parts, respondents rated chassis and fuel as most interesting (4.2 out of a possible 5). Powertrain (engine/transmission) and body panels were rated highly as well (4.1 each).

 **How interested do you think automakers are in reducing weight from the following?**

Mean Interest Rating
(5-point scale where 1 = 'not at all interested' and 5 = 'very interested')

| Part | Mean Interest |
|----------------------------------|---------------|
| Chassis and fuel | 4.2 |
| Powertrain (engine/transmission) | 4.1 |
| Body Panels | 4.1 |
| Body in White | 4.0 |
| Closure Panels | 3.9 |
| Interior | 3.4 |
| Other | 3.8 |

Base = Those respondents who rated each part.

CAFE Fuel Economy Standards

Respondents rated aluminum and engineering plastics highest based on their ability to help meet the new CAFE fuel economy standards.

When asked to rate materials based on their ability to help meet new CAFE fuel economy standards, respondents rated aluminum and engineering plastics (e.g. ABS, nylon) highest (4.2 each). Advanced composites (continuous fiber, carbon fiber) was also rated highly (4.1).

➔ *How would you rate each of the following materials based on their ability to help meet the new CAFE fuel economy standards?*

Mean Helpfulness Rating
(5-point scale where 1 = 'not at all helpful' and 5 = 'very helpful')

| Materials | Mean Rating |
|---|-------------|
| Aluminum | 4.2 |
| Engineering plastics (eg, ABS, nylon) | 4.2 |
| Advanced composites (continuous fiber, carbon fiber) | 4.1 |
| Advanced high-strength steel | 3.9 |
| Multi-material solution | 3.8 |
| Magnesium | 3.1 |
| Low global warming potential air conditioning refrigerant | 2.8 |
| Other | 3.2 |

Base = Those respondents who rated each material.

Mass Reduction Focus

The largest segment of respondents are varying their approach for mass reduction by vehicle platform.

More than one in three respondents (36%) indicated that they vary their approach to mass reduction depending on the vehicle platform. Three in ten (29%) indicated they are redesigning each component/system to improve integration and reduce mass.

➔ **Where is your company focusing most on mass reduction?**

| Weight reduction approach | % Indicating |
|--|--------------|
| Approaches vary by vehicle platform | 36% |
| Redesigning each component/system to improve integration and reduce mass | 29% |
| Utilizing new, advanced materials | 20% |
| Redesigning the vehicle architecture | 4% |
| Other | 11% |

Base = Those respondents who answered the question or 1,097.