

## Five Years of Engineering Thoughts and Opinions

With this 5th edition of our Salary and Career Report, we look back to see how the engineering profession has changed.

Since 2012, our survey has seen an increase of salary growth for engineers. According to our Salary and Career Report, from 2012 to 2014, the average salary was around \$90,000 a year. In 2015, the salary jumped to \$98,000 a year. This is promising for the engineering community as 56.6% of engineers responded that they expect their salary to increase in 2016. Over the last five years, engineers have been extremely satisfied with their work, averaging a satisfaction rate of 90%. They also feel challenged at work over the last five years with 56% answering they are sufficiently challenged and 35% saying they feel somewhat challenged.

These trends of salary and job satisfaction are encouraging for the engineering profession. However, the average age of engineers is pushing more to the right. In the last five years, the percentage of new engineers has decreased and engineers as a whole are getting older. For engineers under 25, the percentage is below 1% for 2016. Engineers between the ages 30 to 39 comprised as high as 11% in 2013 of the engineering community and have declined to 8% in 2016. The same goes for other age ranges. The 40 to 49 age group has decline from 21% in 2012 to 15% in 2016. Engineers from 50 to 54 were at 20% in 2012 and dropped to 15% in 2016. The older age ranges have seen the most increase. Ages 55 and older have increased from 45% in 2012 to 59% in 2016.

### PROFILE OF A TYPICAL ENGINEER

According to the 2016 survey, the majority of our readers are white males and 74% of our readers are age 50 and older. A little more than half work as a design & development engineer at 58%. This percentage is a bit down from last year (61.7% in 2015). Engineering and operational management comprise 19.3% of current principal job functions. These engineers have the job title of chief, senior, executive, or

lead engineer. At least 55% of our readers work 40 to 50 hours a week.

### OUTLOOK ON NEW TECHNOLOGY AND STANDARDS

Developments in technology and the changing environment have led to the rise of new standards. 52% of engineers said that standards and regulations have become more stringent over the last year. When asked about their opinions on the evolution of new standards, 63% said that it will cause companies to cheat when designing their products and only 32% agreed that they should be more stringent on software or hardware products. Overall, engineers felt that the new green initiatives and new efficiency energy standards would not affect design and manufacturing process or job security. One engineer's response elegantly stated that "Standards are always evolving and changing. As soon as one standard is adopted, work begins on the next release. It helps to provide a level playing field for all manufactures. In general, product safety is paramount. Without such standards some manufactures could/would cut corners resulting in product safety issues, and poor product performance."

### THE FUTURE OF ENGINEERING

The future of engineering is still bright in the eyes of many current engineers. Over the last five years this view point has not changed as a strong 91% would recommend engineering as profession. When asked how they feel the engineering field is changing, one engineer spoke to our the fields of engineering are merging. "The lines are currently blurring between mechanical and electrical engineer. Increasingly we are specifying electrical components required to accomplish motion. It is becoming important to have a basic understanding of the limitations of control systems and their impact on the mechanical systems being designed." As the world of IoT continues to expand, we will see more of how the engineering worlds combine. **md**

—Carlos Gonzalez, Technical Editor

# THE TYPICAL ENGINEER

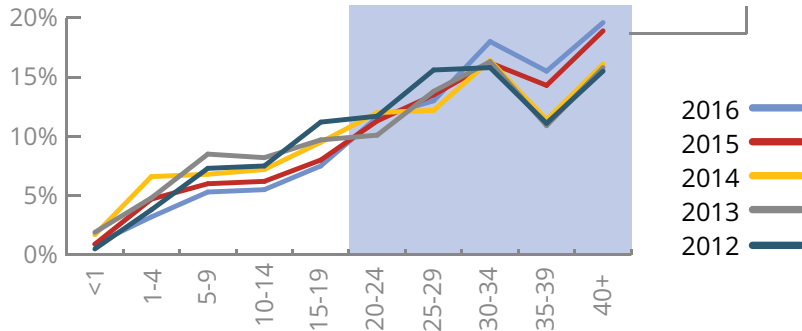


In 2016

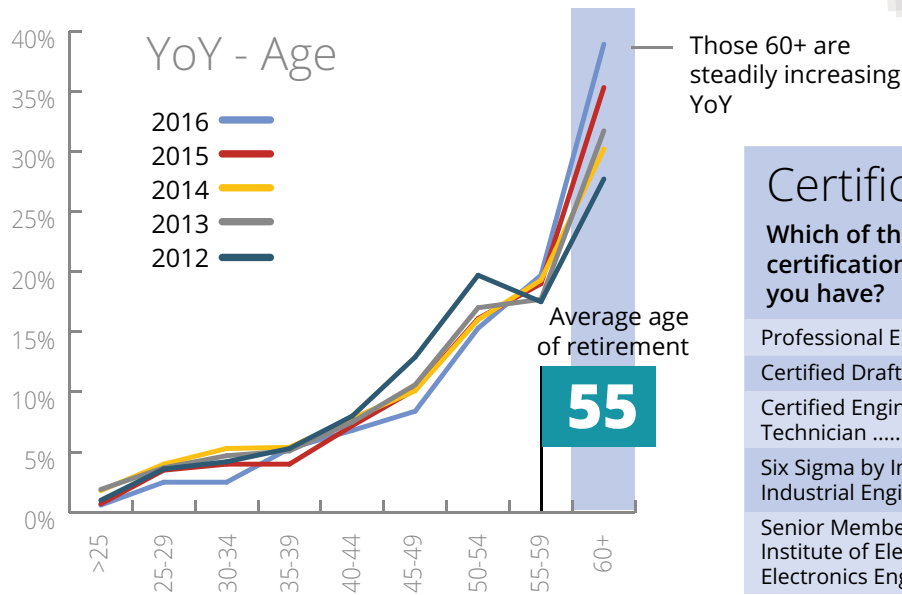
**77%**

of engineers have **20+ years of experience**

## YoY - Years in the Profession



## YoY - Age

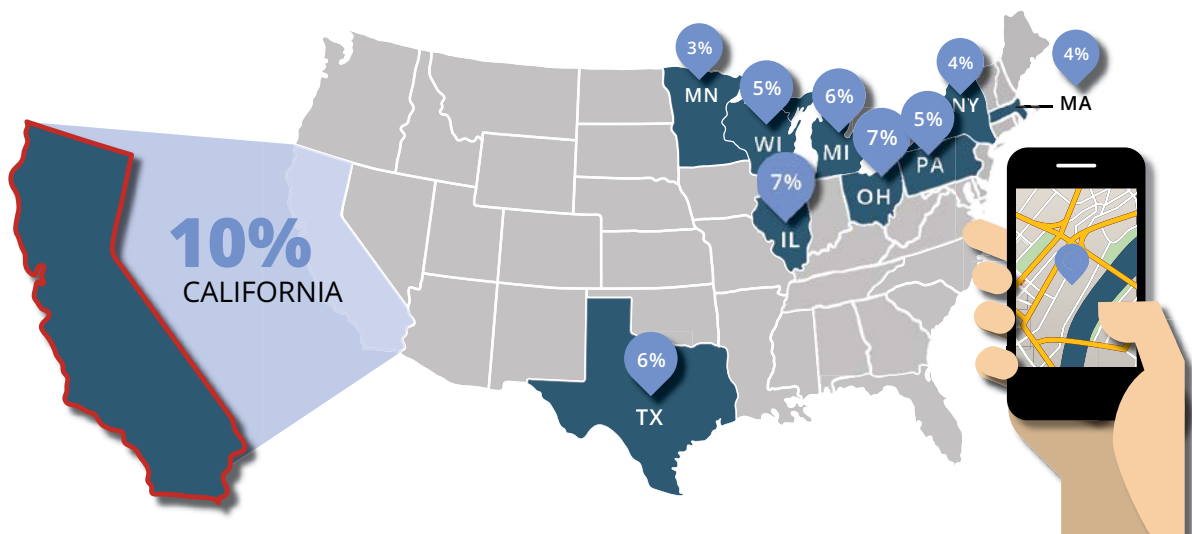


## Certification

Which of the following certifications do you have?

|  |              |
|--|--------------|
| Professional Engineer.....   | <b>42.6%</b> |
| Certified Drafter .....  | <b>15.5%</b> |
| Certified Engineering Technician .....                                       | <b>14%</b>   |
| Six Sigma by Institute of Industrial Engineers .....                         | <b>8.4%</b>  |
| Senior Member of the Institute of Electrical and Electronics Engineers ..... | <b>5.2%</b>  |

## Top Work Locations in 2016





# COMPENSATION

## Average Salary in 2016

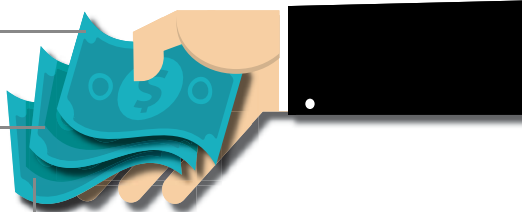
**\$99,933**



**\$5,381**  
Average bonus

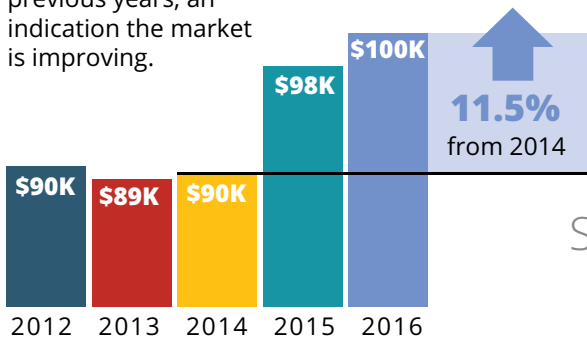
**\$5,500**  
Average stock options

**\$5,826**  
Average other options



## YoY - Average Salaries

Seeing a large jump in average salary as compared to previous years, an indication the market is improving.



Since 2012, the value of \$1 has risen to \$1.05, which is a cumulative rate of inflation of 4.8%. The increasing rate of the average engineer's salary surpassed that rate, jumping 10.7% from 2012.

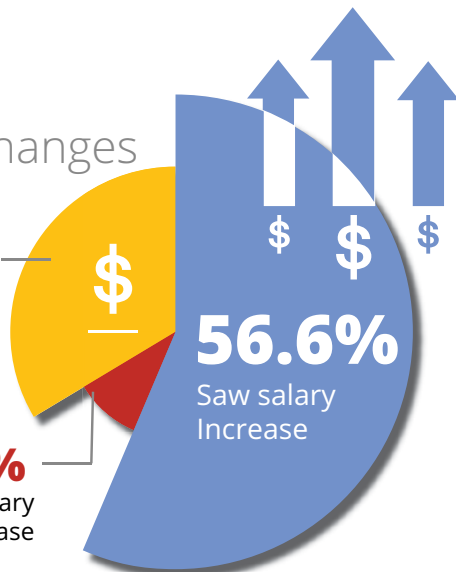
## Salary Changes

**33.5%**  
Salary stayed the same



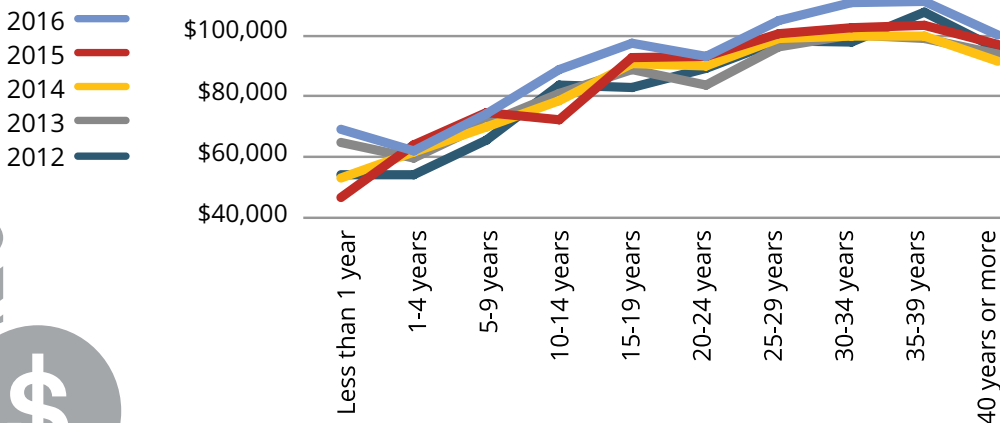
**9.8%**  
Saw salary decrease

**56.6%**  
Saw salary increase



## YoY - Salary by Experience

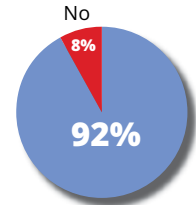
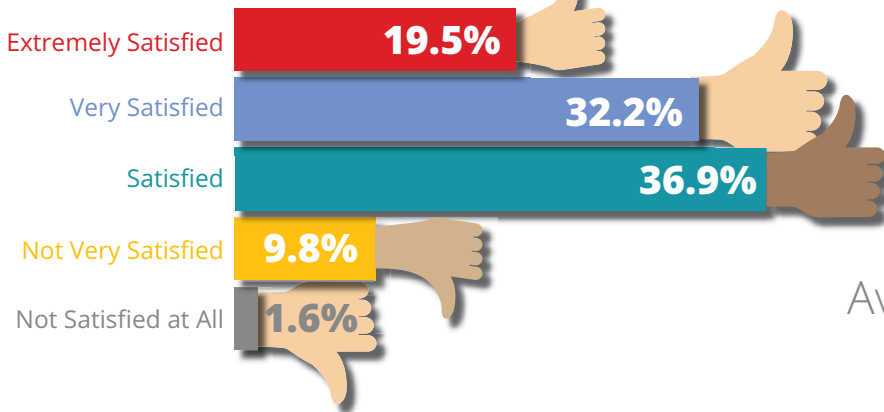
Salary trends closely YoY for past five years - with compensation generally rising with experience. Again, **seeing highest values in 2016.**



# JOB SATISFACTION

Recommend Engineering

How Satisfied Are You?



Average Hours per Week  
**40.8**

Down 1.2 hours from 2012

Reasons Engineers Would Leave the Profession



**36%**  
Try something different



**31%**  
Pursue other opportunities



**26%**  
Do something more fulfilling



**25%**  
Make more money

Feeling Challenged

**58%**

Sufficiently challenged

**33%**

Somewhat challenged

Most Important Factors in Job Satisfaction

## Challenges

The challenges that accompany the design of new products



## Research

Researching potential design solutions



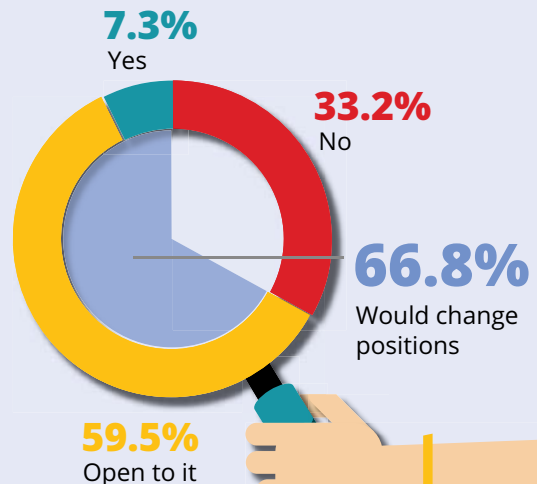
## Benefits Society

Opportunity to design products that can benefit society

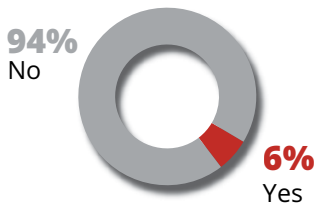


# EMPLOYMENT OUTLOOK

Actively Seeking a New Position



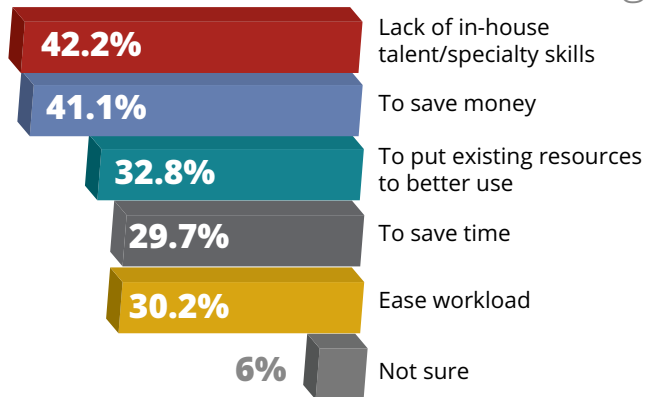
## Planning to Outsource?



## Currently Outsourcing?



## Reasons for Outsourcing



## CONCERNS

Resources



Time



Funding



## Top Concerns at Work (on a scale of 1-10)

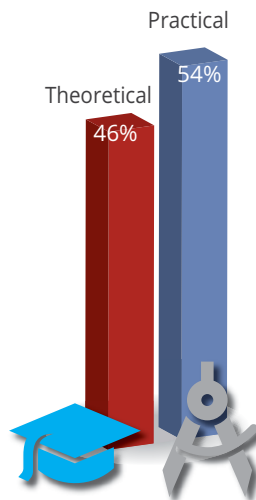
|   |      |
|---|------|
| Insufficient people resources to get the job done | 6.77 |
| Time-to-market pressures                          | 6.41 |
| Finding resources for my designs                  | 6.3  |
| Inability to adequately test product designs      | 6.17 |
| Insufficient funding for my design projects       | 6.14 |
| Having to compromise my design approaches         | 6.04 |
| Competitive market pressures                      | 5.86 |
| Lack of design management direction               | 5.78 |
| Politics at work                                  | 5.42 |
| Shrinking product life cycles                     | 5.24 |
| Management is taking company in wrong direction   | 4.85 |
| Second sourcing for the components specified      | 4.76 |
| Seniority issues                                  | 3.86 |



## Work Being Outsourced

|                                  |      |
|----------------------------------|------|
| Design                           | 50.8 |
| Manufacturing/assembly           | 38.7 |
| Software engineering/development | 32.3 |
| CAD/CAE                          | 34.3 |
| Drafting                         | 28.2 |
| R&D                              | 17.7 |
| Design verification              | 16.7 |
| PCB layout                       | 14.2 |
| Software verification/test       | 10.3 |
| Final test                       | 10.1 |
| Incoming inspection              | 3.8  |

## Educational training (theoretical vs. practical)

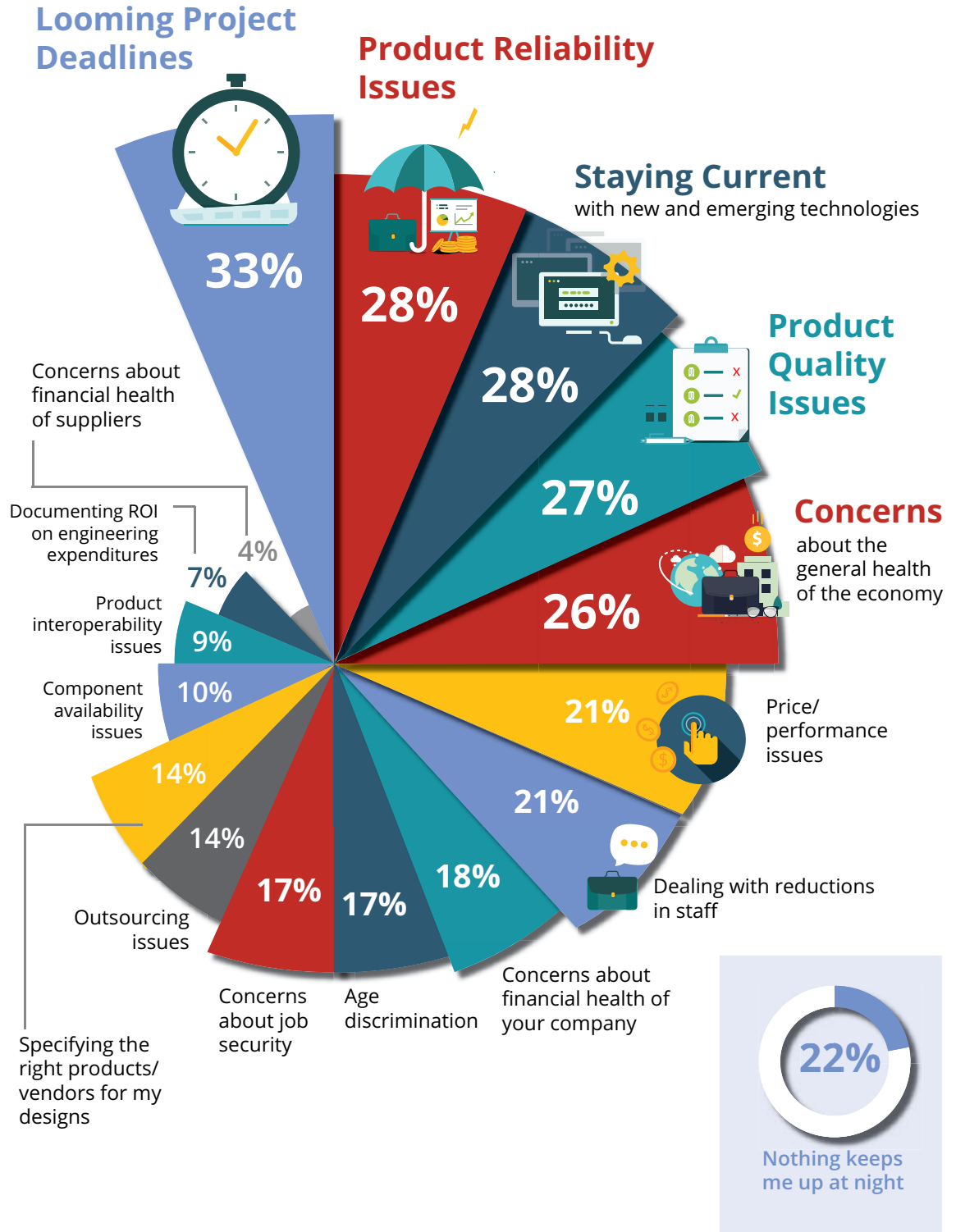


**An engineer's thoughts: What percentage of your engineering knowledge is theoretical vs. practical?**

"I think engineering education should be more practical and hands-on... working with industry on real world projects. I learned more about practical design and engineering during my internship than in the university classroom. If university professors came from industry instead of lifelong academia, more practical knowledge could be passed along... reducing the time needed to train new engineers fresh out of university."

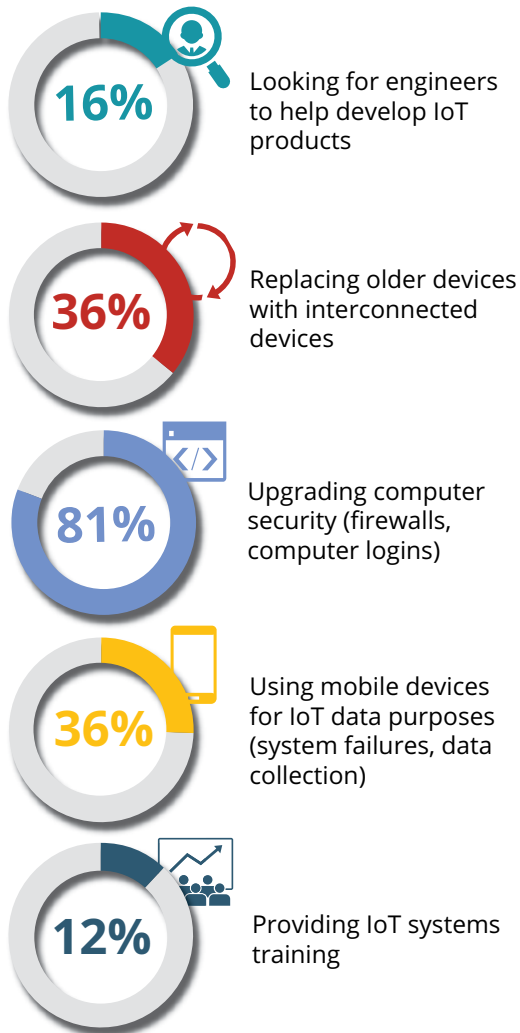
2016

# WHAT'S KEEPING ENGINEERS UP AT NIGHT?



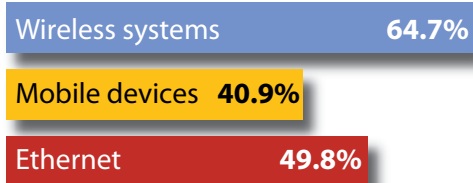
# THE INTERNET OF THINGS (IoT)

## My Company is...



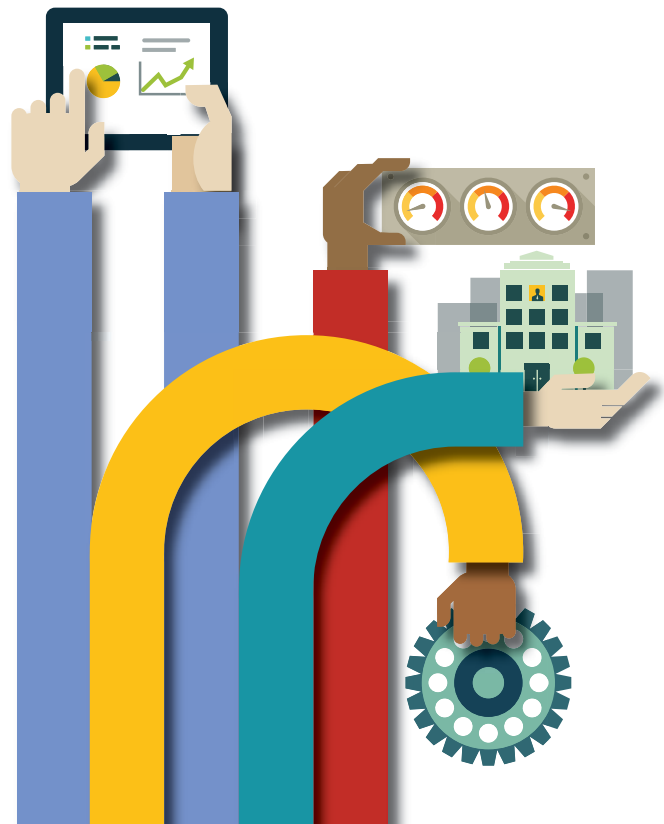
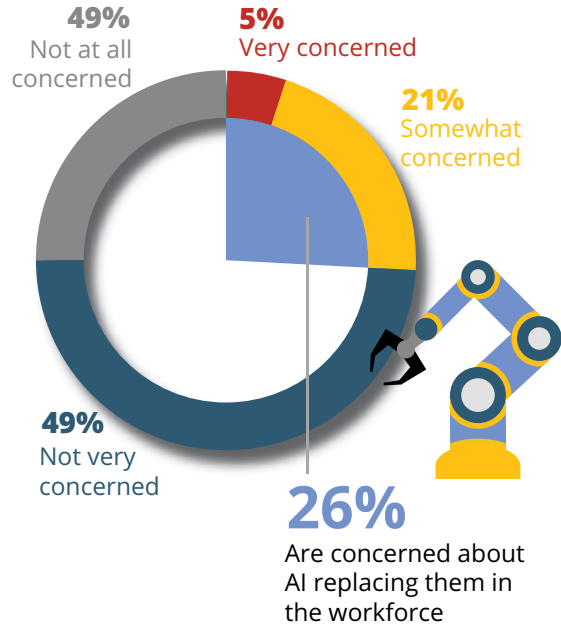
## IoT Investing

How has your company invested in IoT systems upgrades?



## Artificial Intelligence

How concerned are you that artificial intelligence will replace large amounts of people in the workforce?



## CLIMATE CHANGE

Is the market demanding low power requirements in your product design?

Are the new green initiatives affecting your design or manufacturing process?

62%  
No  
38%  
Yes

66%  
No  
34%  
Yes

96%  
No  
4%  
Yes

75%  
No  
25%  
Yes

If the agreement reached at the Paris Climate Summit becomes legally binding, do you think it significantly influence your company's long-term strategy?

Do you feel threatened in your job security now that efficiency standards are changing?

## STANDARDS & REGULATIONS

Have standards and regulations in your industry become more stringent over the last year?

52%  
Yes  
48%  
No

32%  
Yes  
68%  
No

In your view, should standards and regulations be more stringent on software or hardware?

37%  
No  
63%  
Yes

### An engineer's thoughts:

#### Why are stricter standards necessary?

*"To reduce air pollution and the use of fossil fuels in the end-product (i.e. autos, trucks, airplanes, etc). Also, manufacturing safety and environmental standards have become more stringent, and while making things more difficult this ultimately is a good thing."*

In your view, will stricter standards create more cases of companies cheating on standards?