



29 September -1 October / 29 Eylül - 1 Ekim 2016

TÜYAP Fair, Convention & Congress Center, İstanbul

**8. Uluslararası Döküm Kongresi / 8th International Foundry Congress by TUDOKSAD Academy**

In conjunction with Ankiros / Annofer / Turkcast fairs

**«Dünya Otomotiv Sanayine Yön Veren Faktörler  
Daha Hafif Bir Gelecek Hedefi»**

**«What's Driving the Global Casting Automotive Industry?  
Passion for Lighter Future»**

**Mustafa Ata  
(Continental Automotive Systems)**

**1.Oturum: Döküm Sektöründe Rekabet Gücü  
1st Session: Competitiveness of Foundry Sector**

**Oturum Başkanı/Session Chairman: Memiş Sağıroğlu (Trakya Döküm Sanayi Tic. A.Ş.)**



Oturumlarda yer alan sunumlar 3 Ekim 2016 Pazartesi tarihinde akademi web sayfasına ([akademi.tudoksad.org.tr](http://akademi.tudoksad.org.tr)) yüklenecektir.



# What's Driving the Global Casting Automotive Industry “Passion for Lighter Future”

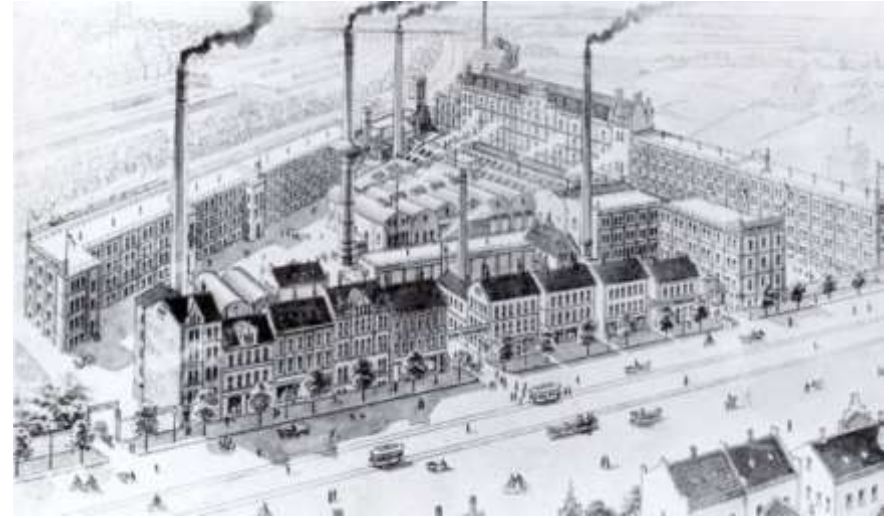
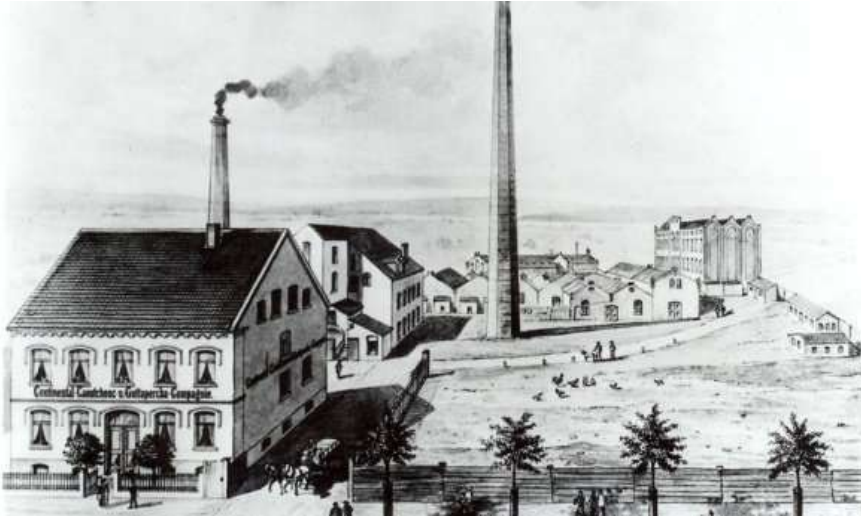
ANKIROS

8. Uluslararası Döküm Kongresi – Istanbul - Turkey

Sept. 29<sup>th</sup> – October 01<sup>st</sup>, 2016

# Continental Corporation

## Over 140 Years of Innovation and Progress



1871-1900

1901-1930

1931-1960

1961-1990

1991-2015

Spirit of Optimism

- › Continental-Caoutchouc- & Gutta-Percha-Compagnie is founded in Hanover on October 8, 1871, as a joint stock company.
- › Manufacturing includes rubberized fabrics, solid tires for carriages and bicycles, as well as soft rubber products.

# Continental Corporation

## Over 140 Years of Innovation and Progress

Driving safety

Driving assistance

Chassis dynamics

Systems for the powertrain

Systems for hybrid and electric drives

Infotainment and multimedia

Telematics and instrumentation

Tires and extended mobility systems

Technical elastomer products

Vibration damping and noise optimization



1871-1900

1901-1930

1931-1960

1961-1990

1991-2015

Automotive Supplier

- › The first environment-friendly passenger tire is launched.
- › Introduction of the key technology for hybrid drive systems.
- › Takeover of Phoenix AG.
- › Acquisition of Siemens VDO Automotive AG.
- › Acquisition of the industrial hose and conveyor belt manufacturer Veyance Technologies Inc.

# Continental Corporation

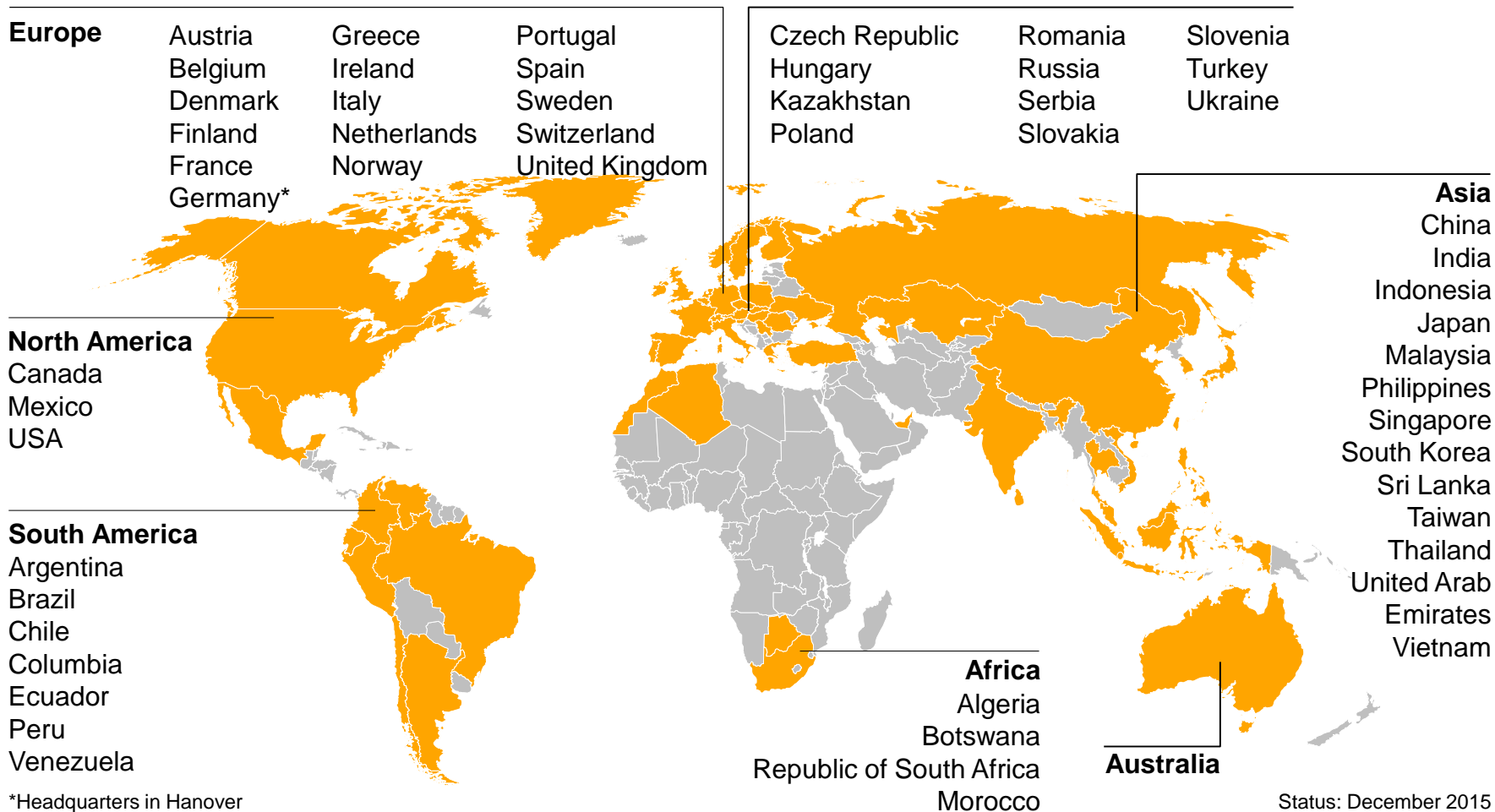
## Five Strong Divisions

Chassis & Safety	Powertrain	Interior	Tires	ContiTech
Vehicle Dynamics	Engine Systems	Instrumentation & Driver HMI	PLT, Original Equipment	Air Spring Systems
Hydraulic Brake Systems	Transmission	Infotainment & Connectivity	PLT, Repl. Business, EMEA	Benecke-Kaliko Group
Passive Safety & Sensorics	Hybrid Electric Vehicle	Intelligent Transportation Systems	PLT, Repl. Business, The Americas	Compounding Technology
Advanced Driver Assistance Systems (ADAS)	Sensors & Actuators	Body & Security	PLT, Repl. Business, Asia Pacific	Conveyor Belt Group
	Fuel & Exhaust Management	Commercial Vehicles & Aftermarket	Commercial Vehicle Tires	Elastomer Coatings
			Two Wheel Tires	Industrial Fluid Systems
				Mobile Fluid Systems
				Power Transmission Group
				Vibration Control

PLT – Passenger and Light Truck Tires

# Continental Corporation

## 430 Locations in 55 Countries

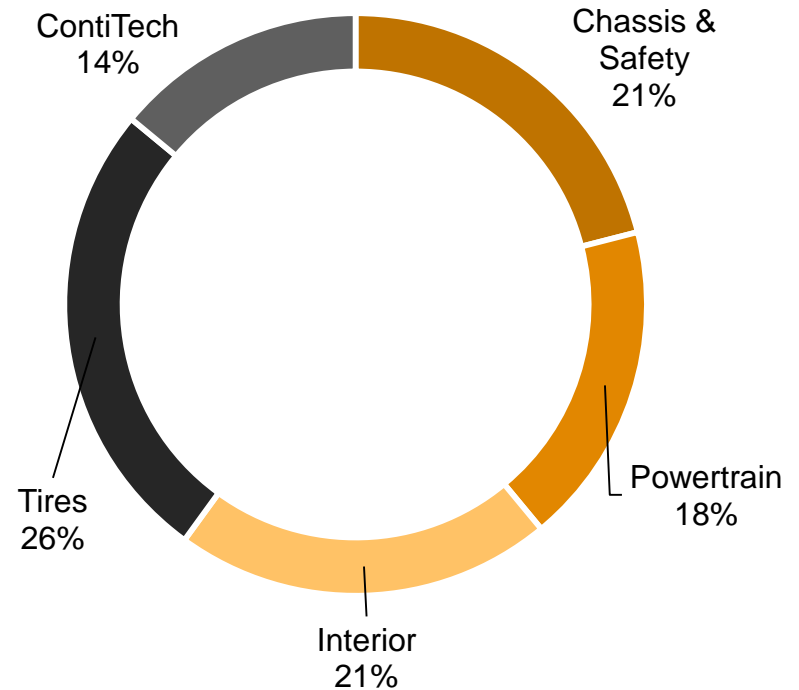


# Continental Corporation

## Overview 2015

- 
- › Since 1871 with headquarters in Hanover, Germany
- 
- › Sales of €39.2 billion
- 
- › 207,899 employees worldwide
- 
- › 430 locations in 55 countries
- 

Sales by division in %



Status: December 31, 2015

# What's Driving the Global Casting Automotive Industry - "Passion for Lighter Future"

## ANKIROS 8. Uluslararası Döküm Kongresi

- › Global casting automotive Industry is driving  
"Lighter Future" combined with "high-strength casting materials"
- › What are the main reasons for that?
  - › to extend /expand the functionality of the vehicles (e.g. Safety, comfort functions,...)
  - › to reduce energy consumption → moving less weight means less energy
  - › Target for 2020: 95g CO<sub>2</sub>/km.
  - › Target until 2025: increasing of light chassis (frame) yearly 15% with China as main market

# What's Driving the Global Casting Automotive Industry - "Passion for Lighter Future"

## ANKIROS 8. Uluslararası Döküm Kongresi

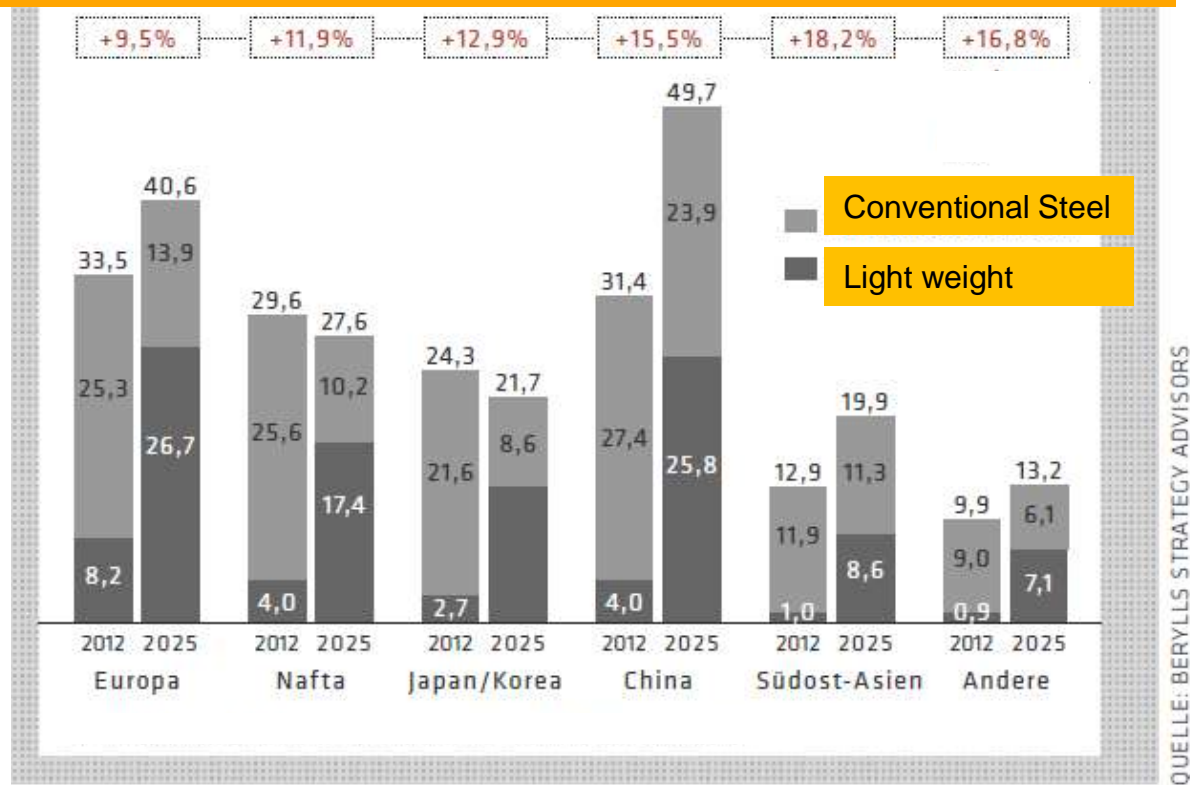
For example: VW-GOLF

- › GOLF I            in 1978                      weight: 790kg
- › GOLF VI        in 2008                      weight: 1.300kg
- › GOLF VII       in 2012                      weight: 1.200kg
- › BMW i3 has driver cell from carbon fiber synthetic material combined with Aluminum-Space-Frame for bottom, rear and front area.
- › Plug-in-Hybrid cars are having already additional weight of approx. 250kg more
- › 20-25% weight of the car is based on chassis (like frame, doors, covers and outer body)
- › Today is around 10% share of the weight made by metals like high-strength Steel, Aluminum, Magnesium and from Plastic to synthetic carbon fiber materials worldwide for Chassis market
- › Attention: It differs also based on Region e. g. in Europe approx. 17% and for premium segment it has up to 51% share
- › The light Chassis market is in the beginning of their development.  
It shall increase up to 5x more until 2025 with a value of approx. 100 billion Euro

# What's Driving the Global Casting Automotive Industry - "Passion for Lighter Future"

## ANKIROS 8. Uluslararası Döküm Kongresi

### Market Growth for light chassis construction Worldwide in Billion Euro



# What's Driving the Global Casting Automotive Industry - “Passion for Lighter Future”

## ANKIROS 8. Uluslararası Döküm Kongresi

### › Example for light products

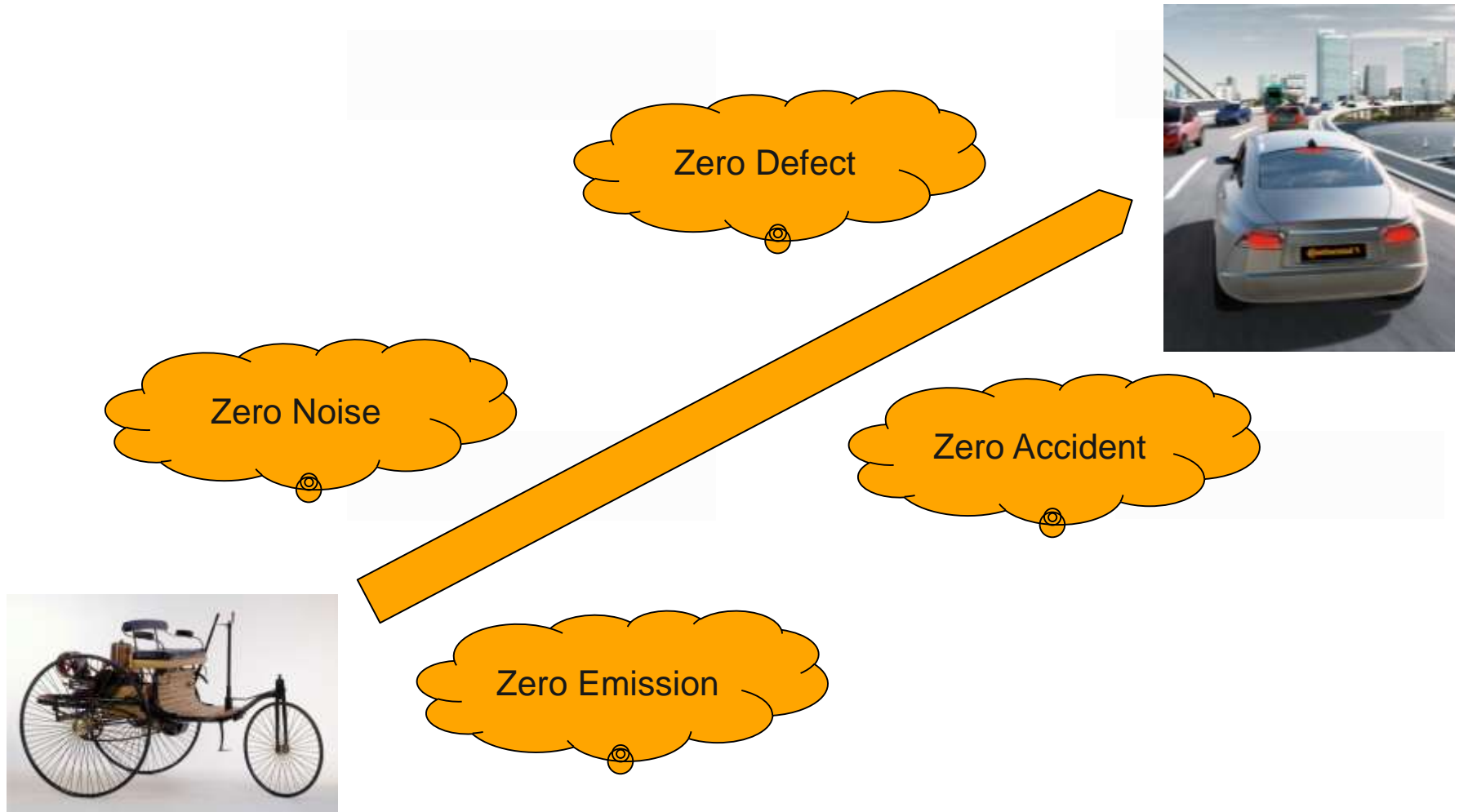


Source: C. Kleinhans

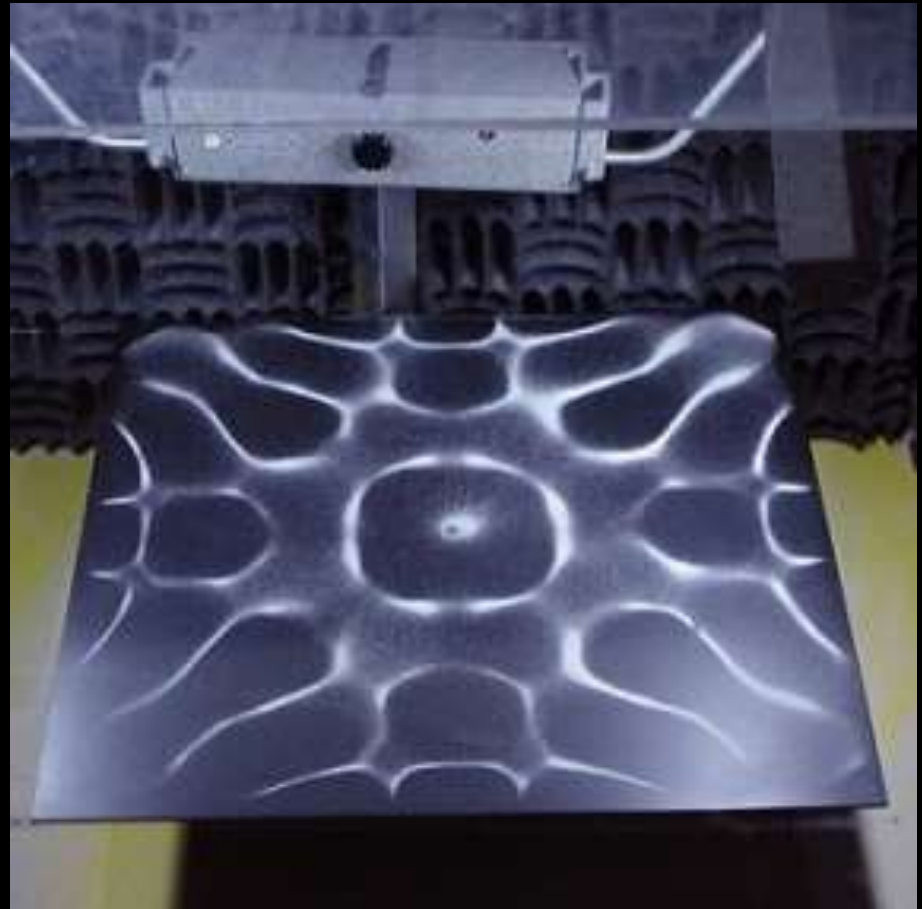
# We Shape the Megatrends in the Automotive Industry: Safety, Environment, Information, Affordable Cars



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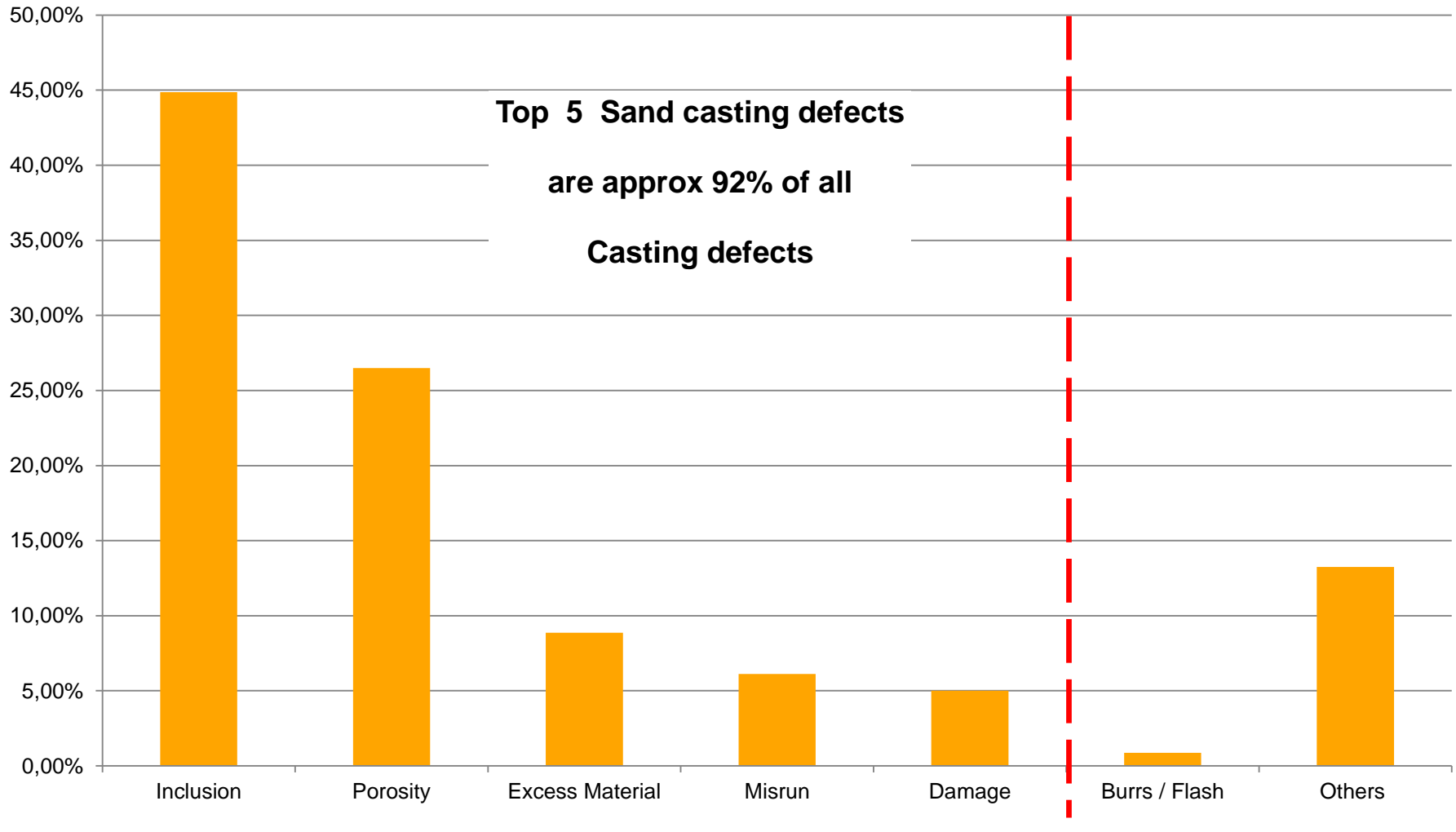
# Zero Noise



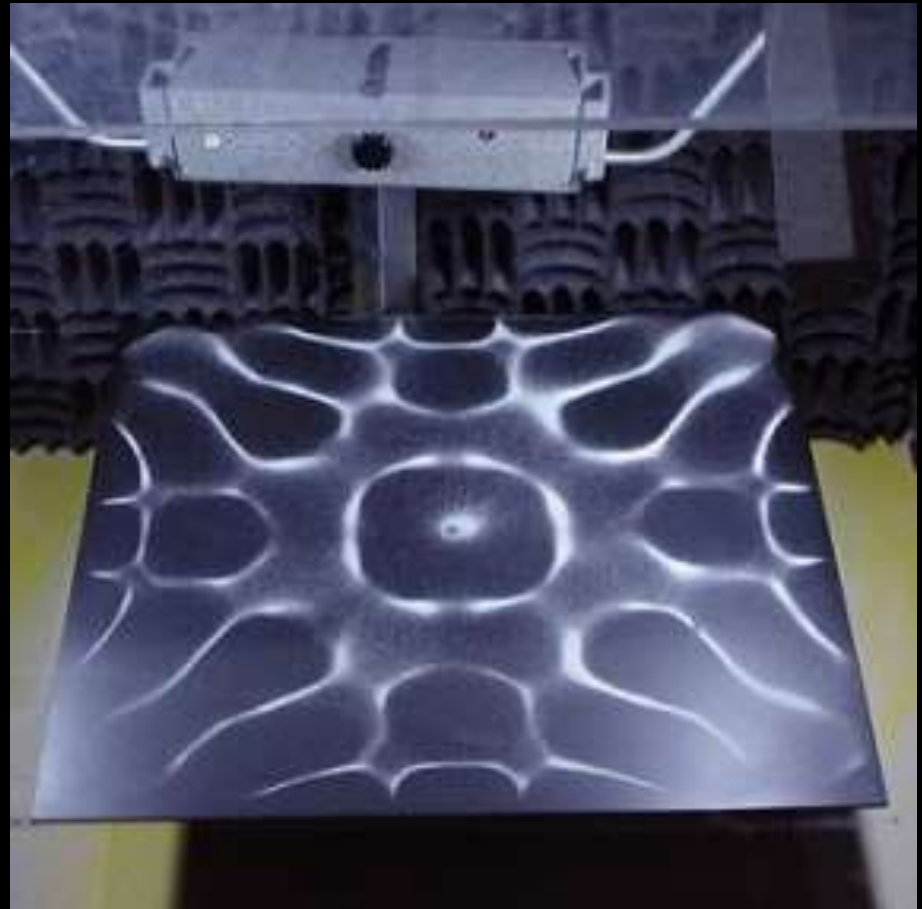
# Zero Defects



# Top Sand Casting Defects



# Zero Noise



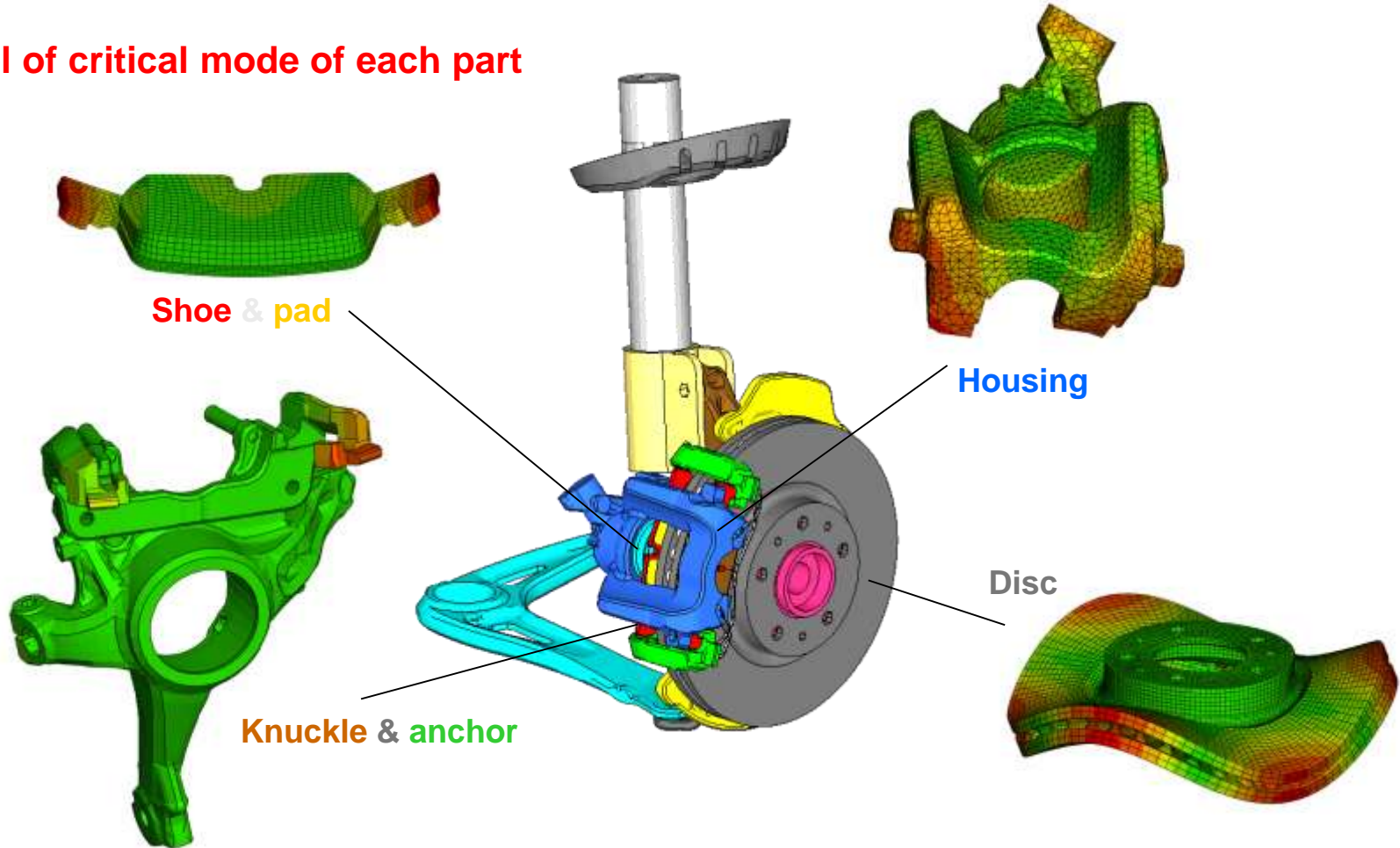
# What's Driving the Global Casting Automotive Industry - "Passion for Lighter Future"

## ANKIROS 8. Uluslararası Döküm Kongresi

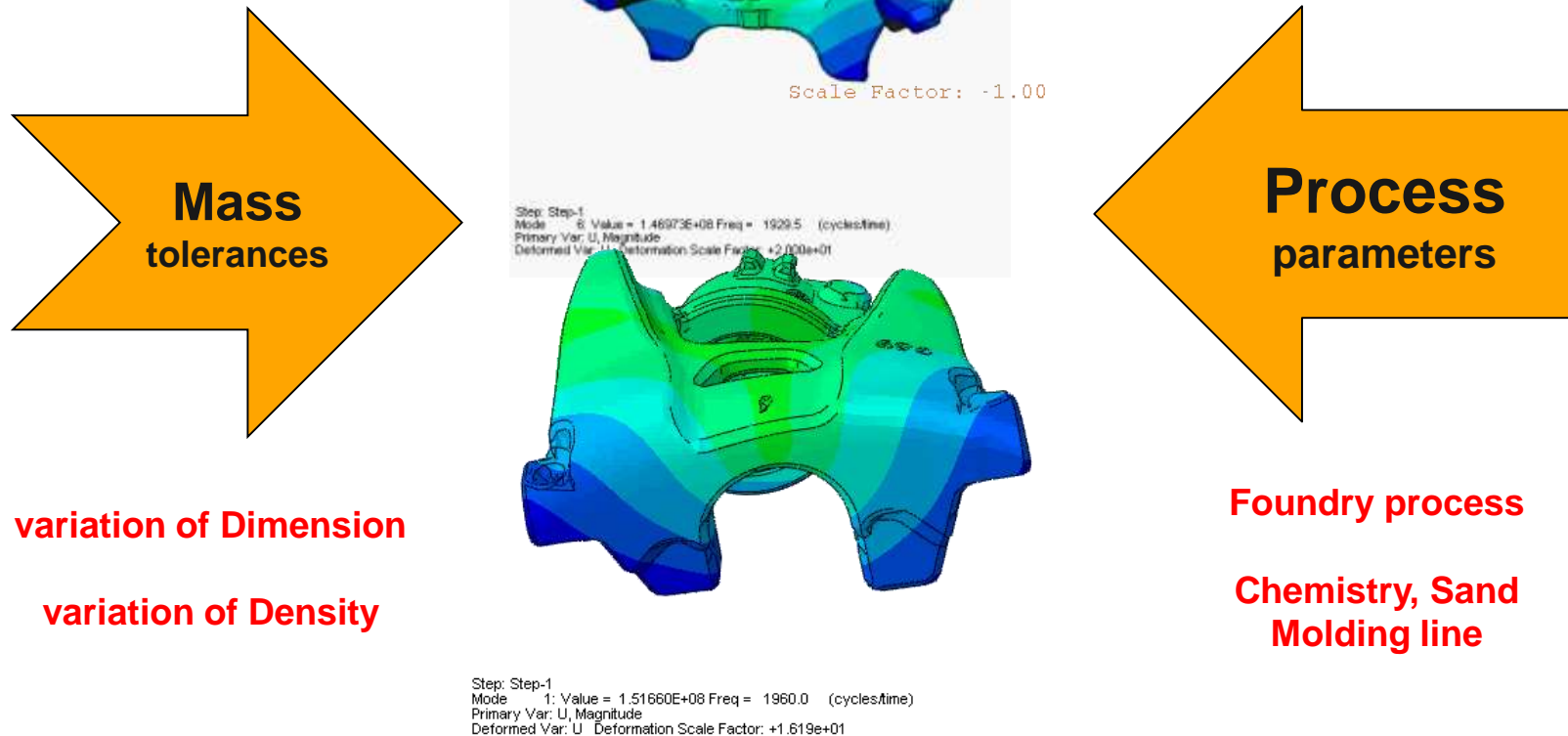
The view of OEM's :

Natural Frequencies of individual sub-components

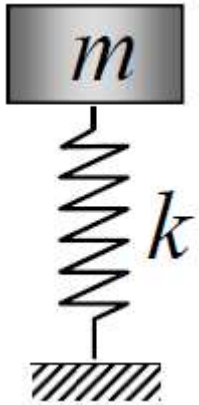
Control of critical mode of each part



### Difficulties for foundries to control the natural frequency



### Natural Frequency is a function of the mass



Mass oscillator

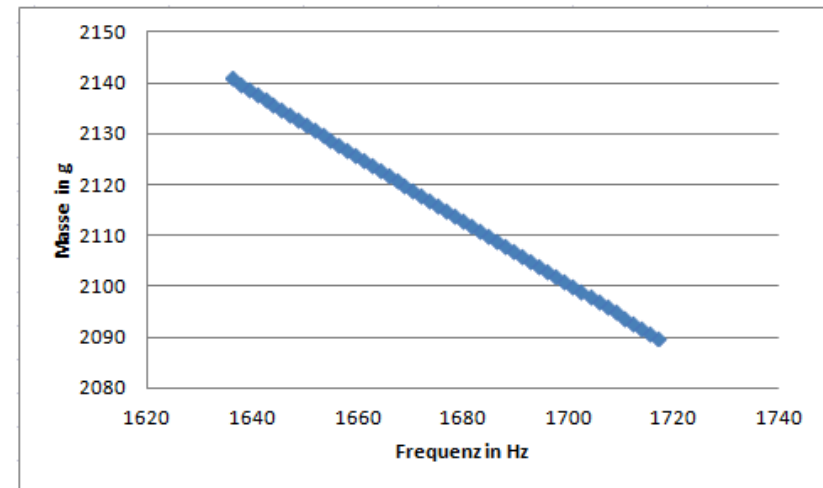
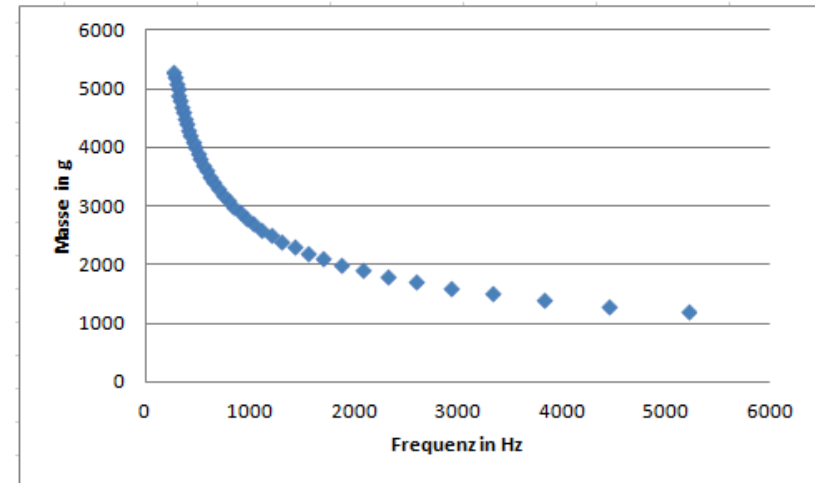
$$\omega_0 = \sqrt{\frac{k}{m}}$$

$$\text{Mass} = \text{Density} \times \text{Volume}$$

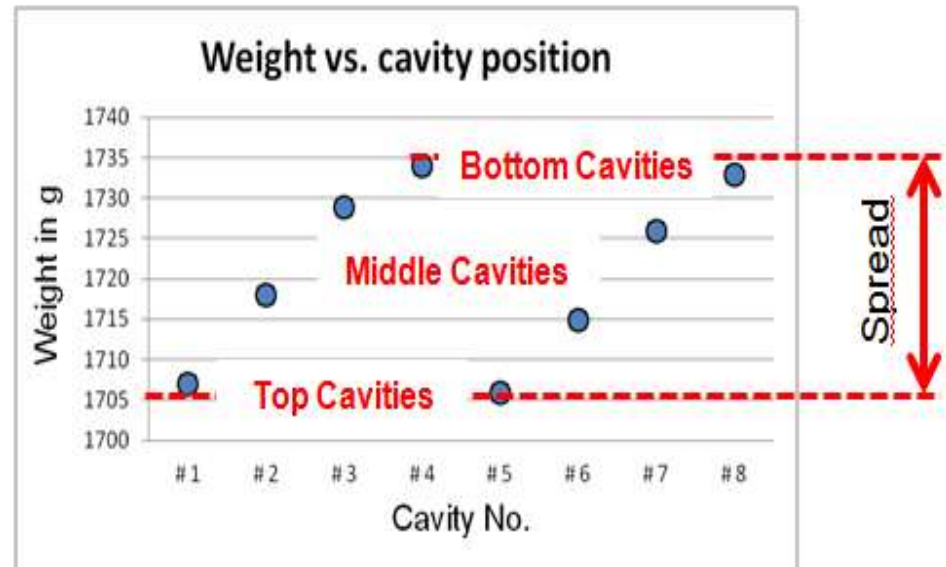
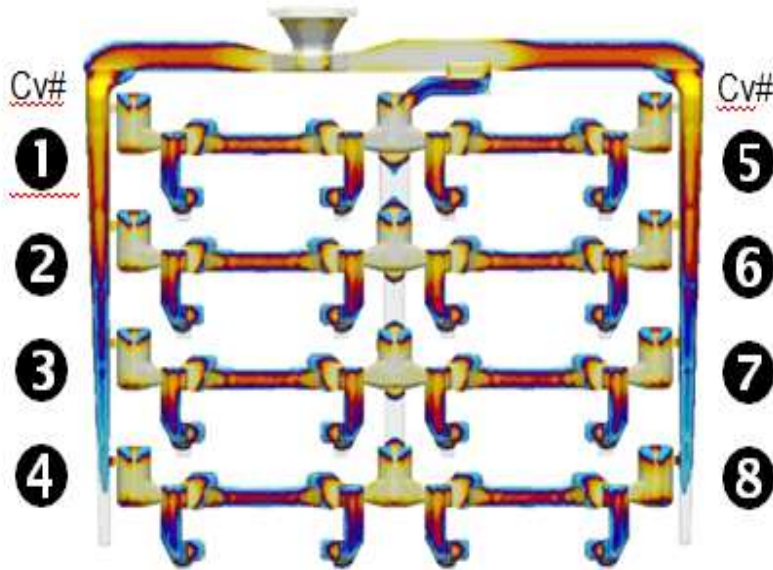
### Control of mass

$m$  = Mass in g;  
 $\rho$  = Density in g/cm<sup>3</sup>;  
 $V$  = Volume in cm<sup>3</sup>  
 $K$  = Spring constant  
 $G$  = Weight in N  
 $g$  = Gravity

$$m = \rho * V$$
$$G = mg$$



### Understanding of Mass stability

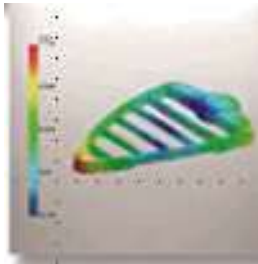


The spread of the mass (weight) over all cavities of a pattern plate should be a minimum

# Optimized and stabilized Processes

# What's Driving the Global Casting Automotive Industry - "Passion for Lighter Future"

## ANKIROS 8. Uluslararası Döküm Kongresi



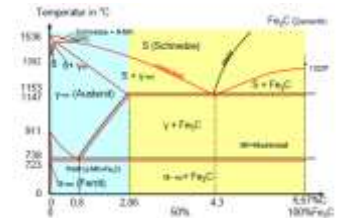
Pattern design



Core Production



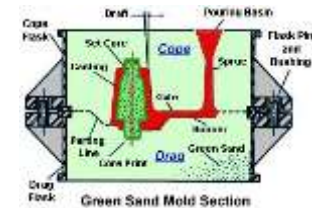
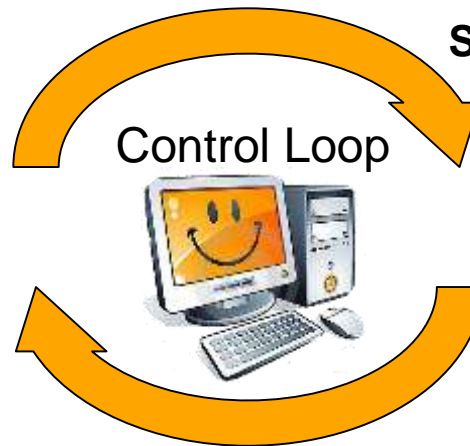
Sand parameters



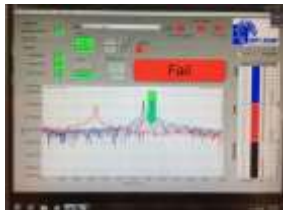
Metallurgical condition



Product design



Moulding operation



Final Control



Shot blasting parameters



Pouring operation



Molding machine

# What's Driving the Global Casting Automotive Industry - "Passion for Lighter Future"

## ANKIROS 8. Uluslararası Döküm Kongresi

### Turbo-Charger



### Brake Systems



### Example for weight reduction

4

**Thank you**  
for your attention!