

1. 電動パワーステアリングシステム

Electric power steering system

AD・ADAS の進化に向けて

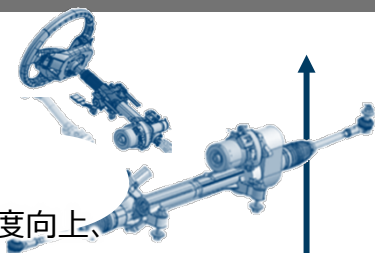
For evolving AD/ADAS

Steer-by-wire system

SBWS

リンクレス構造による車載レイアウトの自由度向上、冗長システムによる安全性の確保
Higher layout flexibility by link-less, secure by redundant systems

開発中
Under development



リンクレス ステア・バイ・ワイヤ

Link less steer by wire

System-A = Conventional

量産化目標

Mass production target

RWA

Full Sys.

System-B = New HMI

普及版ステア・バイ・ワイヤ

Low-cost system intended for popularization



Mechanical reaction force device

EV化・高出力化ニーズ対応

For electrification and high output

Belt Drive Rack Assist Type Electric Power Steering

BRA-EPS

上質・正確な操舵フィール、高出力(PKG効率)、高外乱遮断性
→E-Fセグメント車、大型SUV、Pick-Up、LCV
High quality, accurate steering feel, higher power (package efficiency), high disturbance blocking characteristics
→E-F segments, Large SUV・Pick-Up、LCV



開発中
Under development

Gen4

冗長化(ASIL-C)
Redundancy(ASIL-C)

Gen2

Gen1

量産化

Mass production

冗長化(ASIL-D)
Redundancy(ASIL-C)

性能向上
Performance improvement

高出力化

High output

24kN

16kN

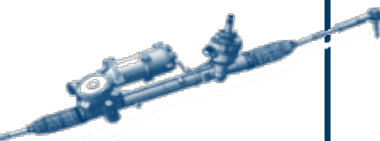
コンベEPSとしてのさらなる進化

For further evolution of Conventional EPS

Dual Pinion Assist Type Electric Power Steering

DPA-EPS

ダイレクトな操舵フィール、2ピニオン構成による高出力(PA<)
→C-Dセグメント車両 (スポーツ、セダン、SUV)
Direct steering feeling, High out by 2 pinion configuration(PA<)
→C-D segments sport, sedan, SUV



Gen2

Gen3

Gen1

量産化

Mass production

高出力化・冗長化(ASIL-B)
High output
Redundancy(ASIL-B)

冗長化(ASIL-D)
性能向上、Weight低減
Redundancy(ASIL-D)
Performance Improvement
Weight Minimization

冗長化(ASIL-C)
Redundancy(ASIL-C)

12kN

10kN

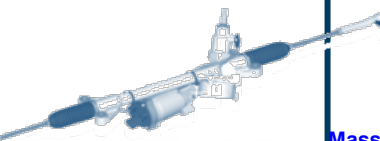
小型車の下流アシストニーズ対応

For lower assist needs of small vehicles

Single Pinion Assist Type Electric Power Steering

PA-EPS

廉価(部品少)、中型車までカバーする出力→A-Cセグメント車両
Low cost (less parts), output covering up to mid-size vehicle→A-C segments



Gen1

Gen2

Gen3

量産化

Mass production

ブラシレス化

Brush-less motor

Gen4

新概念 (廉価×高出力)
New concept
(Low cost × High output)

9kN

2000

2010

2020

2025

2030

出力 (ラック推力)
Output (Rack output)

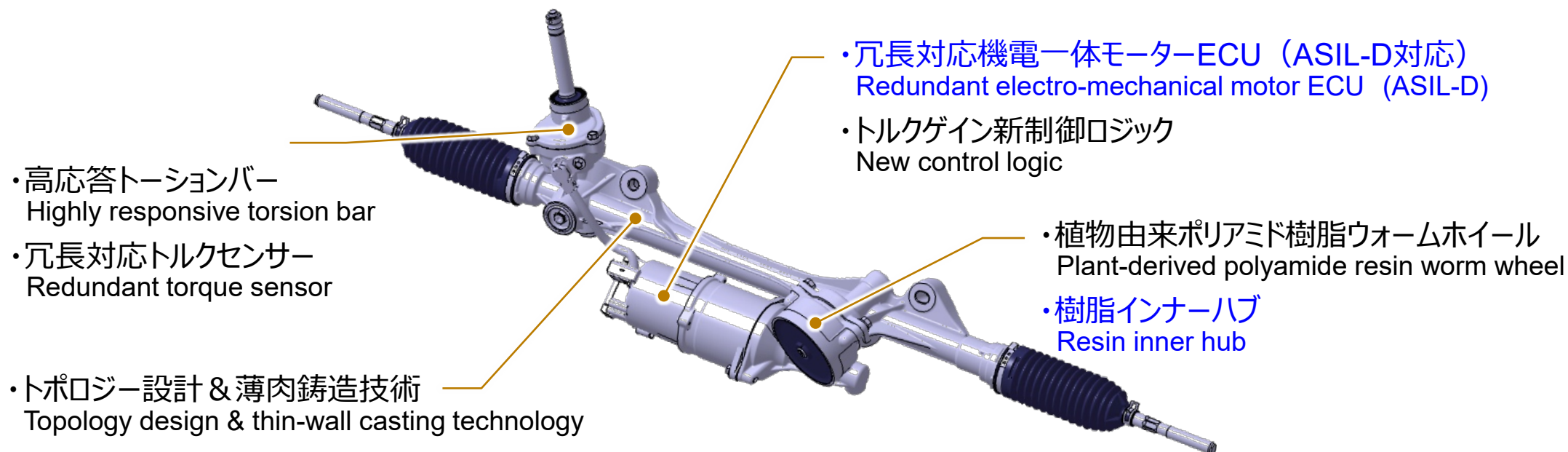
2. デュアルピニオン式電動パワーステアリング

Dual Pinion Assist Type Electric Power Steering (DPA-EPS)



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- ✓ **狙い通りのラインをトレースできる車との一体感**
Provide a sense of unity with the car by intended line traceability
- ✓ **高度運転支援や自動運転にも適合する高い信頼性とアシスト継続性**
High reliability and assist continuity conform to AD/ADAS
- ✓ **軽量化とカーボン・ニュートラル対応による低環境負荷システム**
Low environmental load system with weight reduction and carbon neutral support



3-2. デュアルピニオン式電動パワーステアリングの特長

Features of Dual Pinion Assist Type Electric Power Steering

✓ 環境への取り組み : カーボンニュートラル・燃費/電費向上に貢献

Environmental initiatives: Contributes to carbon neutrality, fuel efficiency/electricity cost improvement

➤ 植物由来の樹脂材を採用

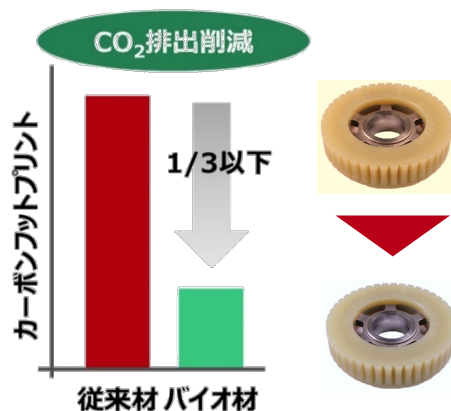
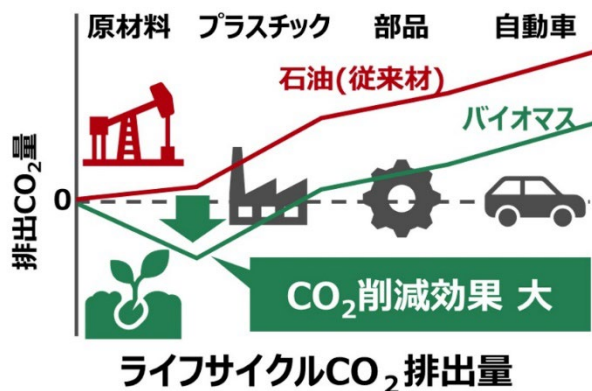
Contributes to carbon neutrality by adopting high-performance resin derived from plants

① 原材料である植物は生育時にCO₂を吸収し、大幅にCO₂排出量を削減

Plants, which are raw materials, absorb CO₂ as they grow, greatly reducing CO₂ emissions

② カーボンフットプリントは従来材料に対し1/3以下

Carbon footprint less than 1/3 of conventional materials



ウォームホイールへ適用
Application example to resin gear

➤ 樹脂材以外への展開

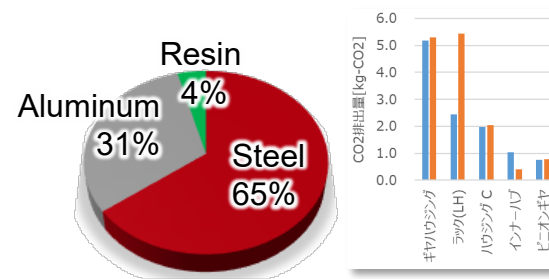
Deployment towards non-resin materials

① CO₂排出量の高いアルミ・鉄への取り組みも開始

Started initiatives for aluminum and iron with high CO₂ emissions

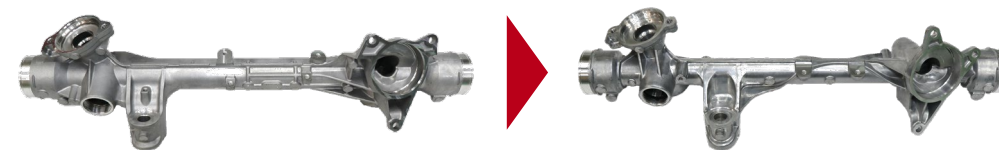
製品に占める材料比率

Material ratio of products



② 薄肉軽量化による使用材料の削減

Reduction of materials used by thin wall weight



Reduced 420g (▲17%)

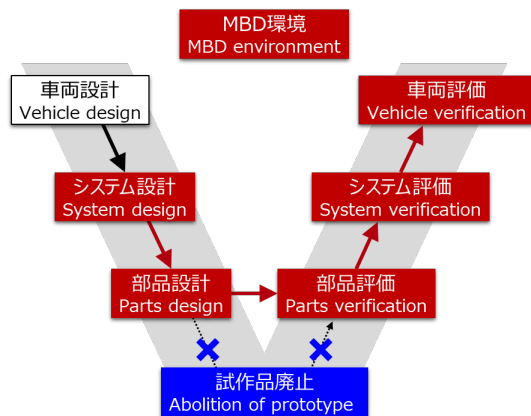
4. Astemoの電動パワーステアリングシステム

Feature of Astemo's electric power steering

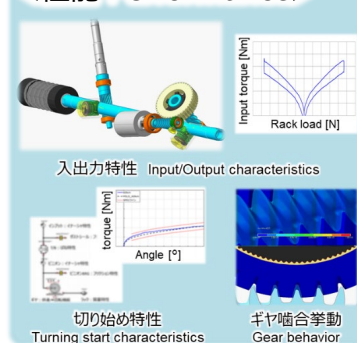
高精度CAE技術

High-precision CAE technology

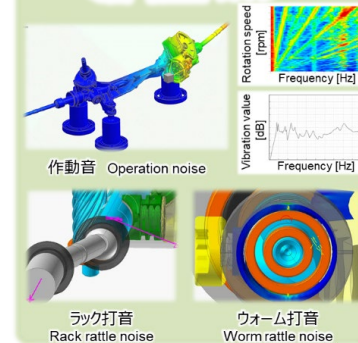
✓ 車両開発の効率化に貢献 Contribute to the high efficiency of vehicle development
(目標: 試作レス開発、手戻りのない開発の実現) (Target: Realization of non prototype and no rework development)



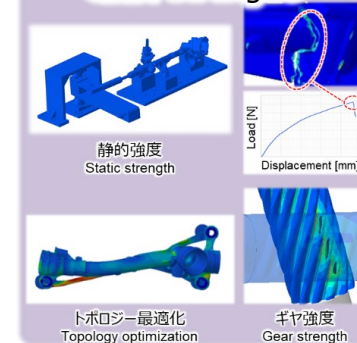
<性能 Performance>



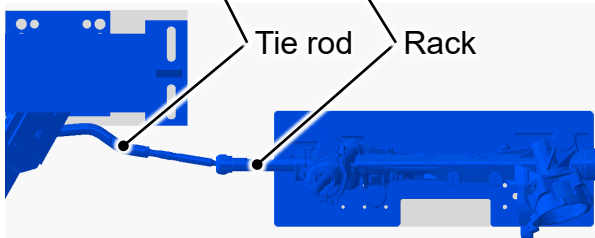
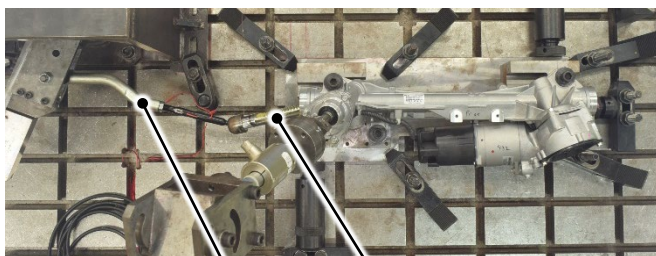
<音・振動 NV>



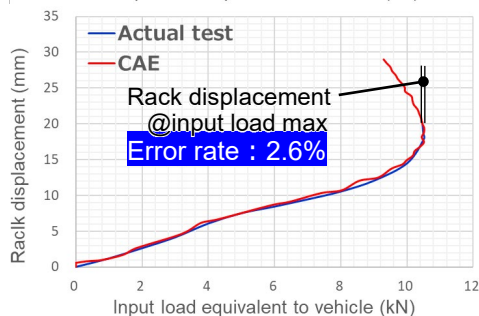
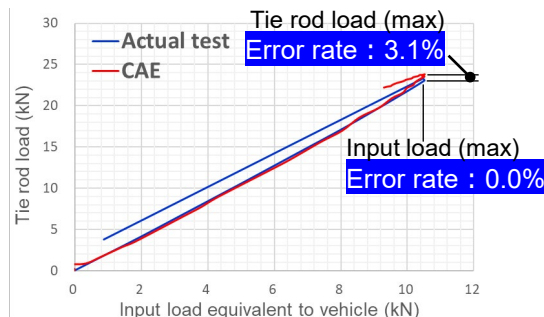
<強度 Strength>



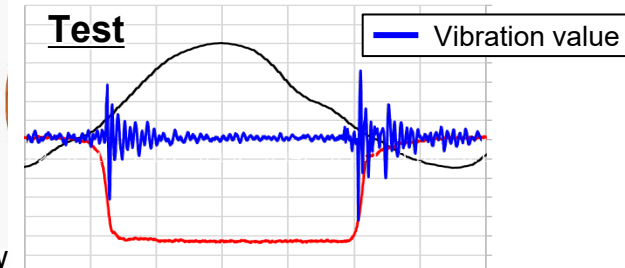
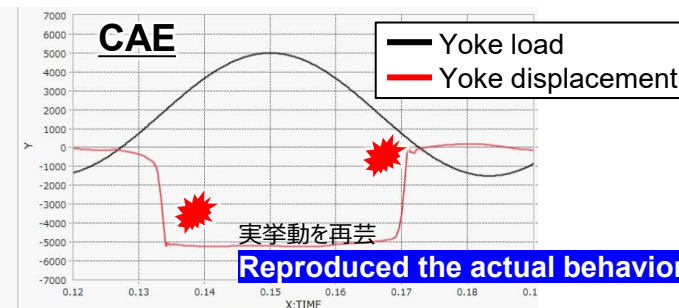
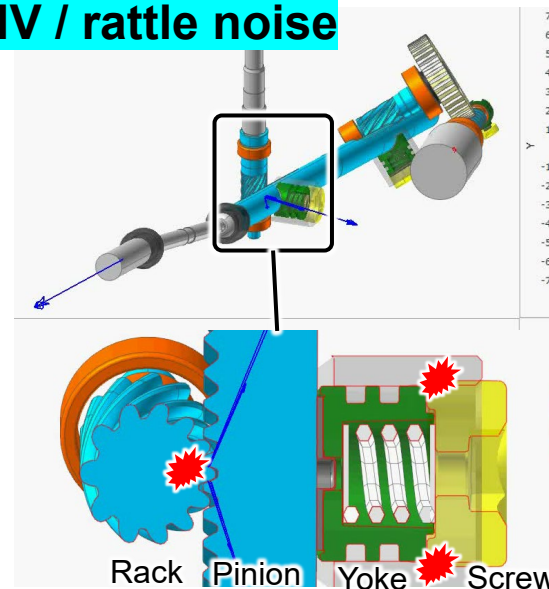
Strength / ASSY strength test



Astemo



NV / rattle noise



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