

International Conference for Next Generation Automobile

Materials for the Next Generation Automobile

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**Miyagi Organization
for Industry Promotion**



Chairman of the Board at Miyagi Organization for Industry Promotion



**Hirosaki
Univeristy**

**Professor Emeritus of Tohoku University &
Hachinohe National College of Technology**



**hachinohe
National
College of
Technology**

Special Adviser to the President at Hirosaki University

**Research Backgrounds are High Temperature Physical Chemistry
on Iron & Steel, Slag & Flux, Silicon, Ceramics or Bio-materials**



**Tohoku
Univeristy**

**Technology Transfer from Universities to Industries
Intellectual Property Rights**



NICHe

Iwaki Mt.

October 8-10 2014



Sendai International

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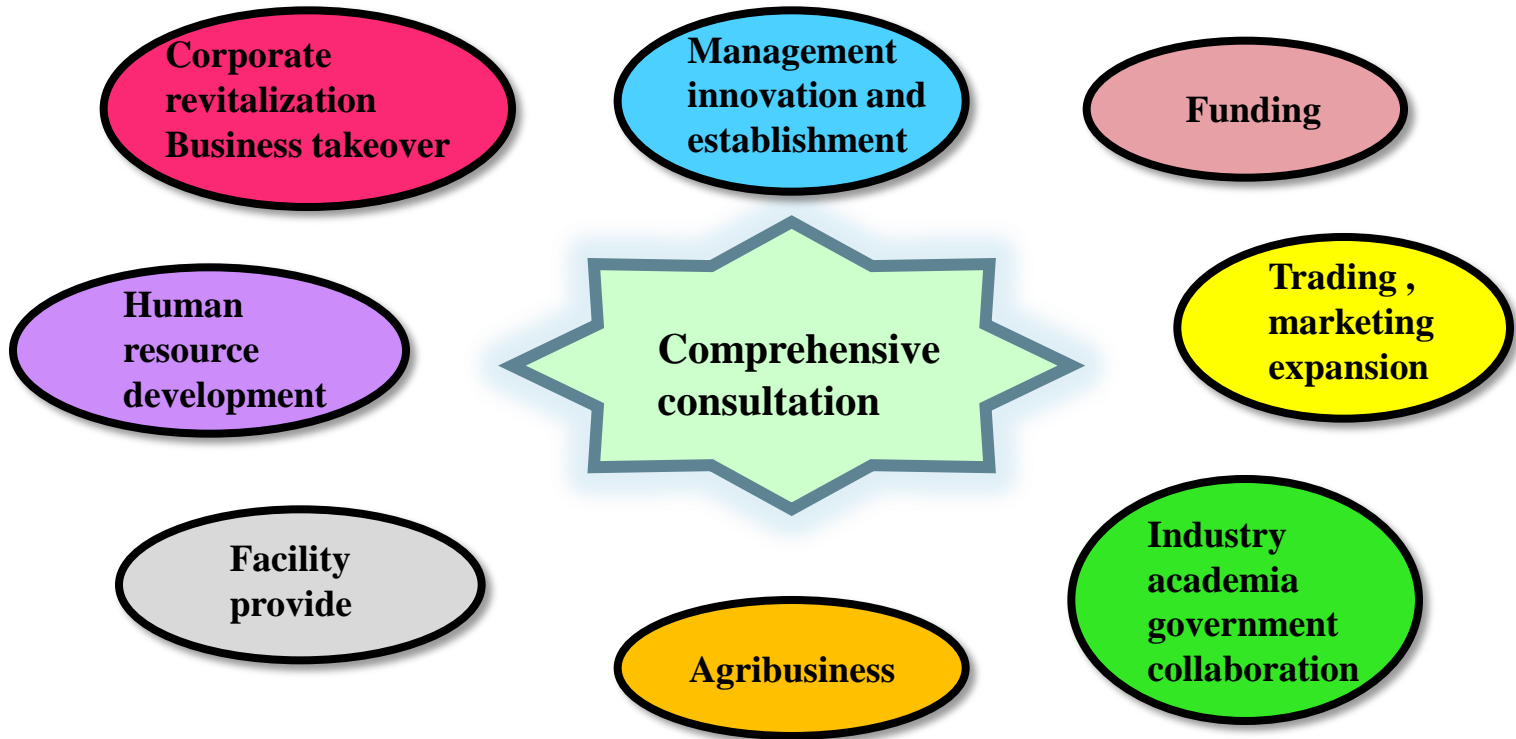
At Tohoku University here in Sendai, many researches on the highly advanced materials have been carried out for a long time after the establishment.

**So, Sendai is call as “Makkah”
on Materials Research.**



Miyagi Organization for Industry Promotion

«flow of the support»



Climate Changes such as flood, heavy rain, heavy snow, storm, tornado and drought are caused by greenhouse gases, mainly carbon dioxide.

United Nation held the climate change summit.

IPCC:

Intergovernmental Panel on climate change

Therefore, fossil fuel should be reduced.

I am afraid that the very severe regulation to emission of CO₂ will be established.

Target of Development of Next Generation Automobile

High Fuel Efficiency, High Mileage

Light Weight → Aluminum, Magnesium, Titanium

Carbon fiber reinforced plastics

Safety to Collision



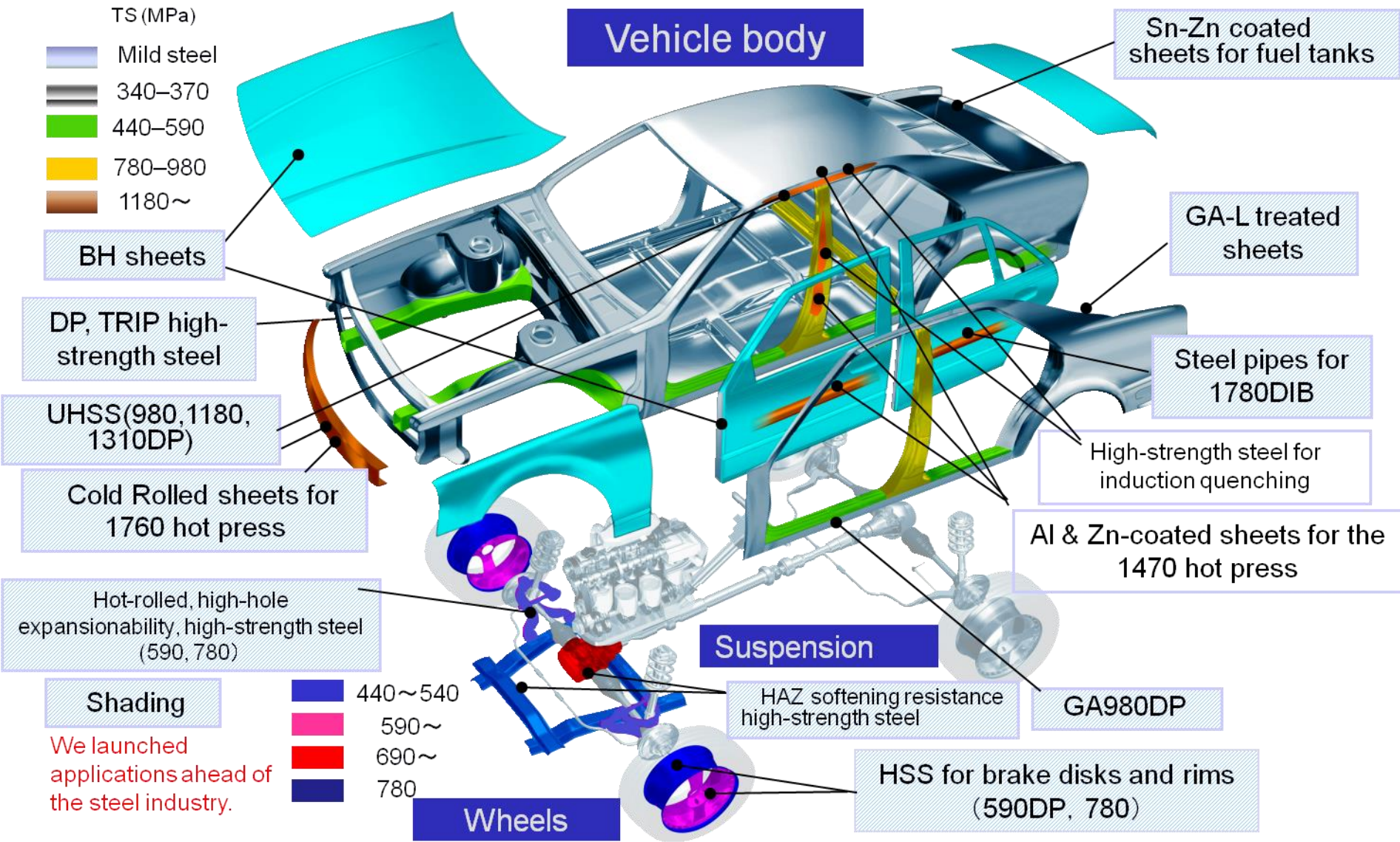
Super High tensile Strength Steel

Catalyst for Exhaust Gas

Workability of Corrosion Resistant Steel

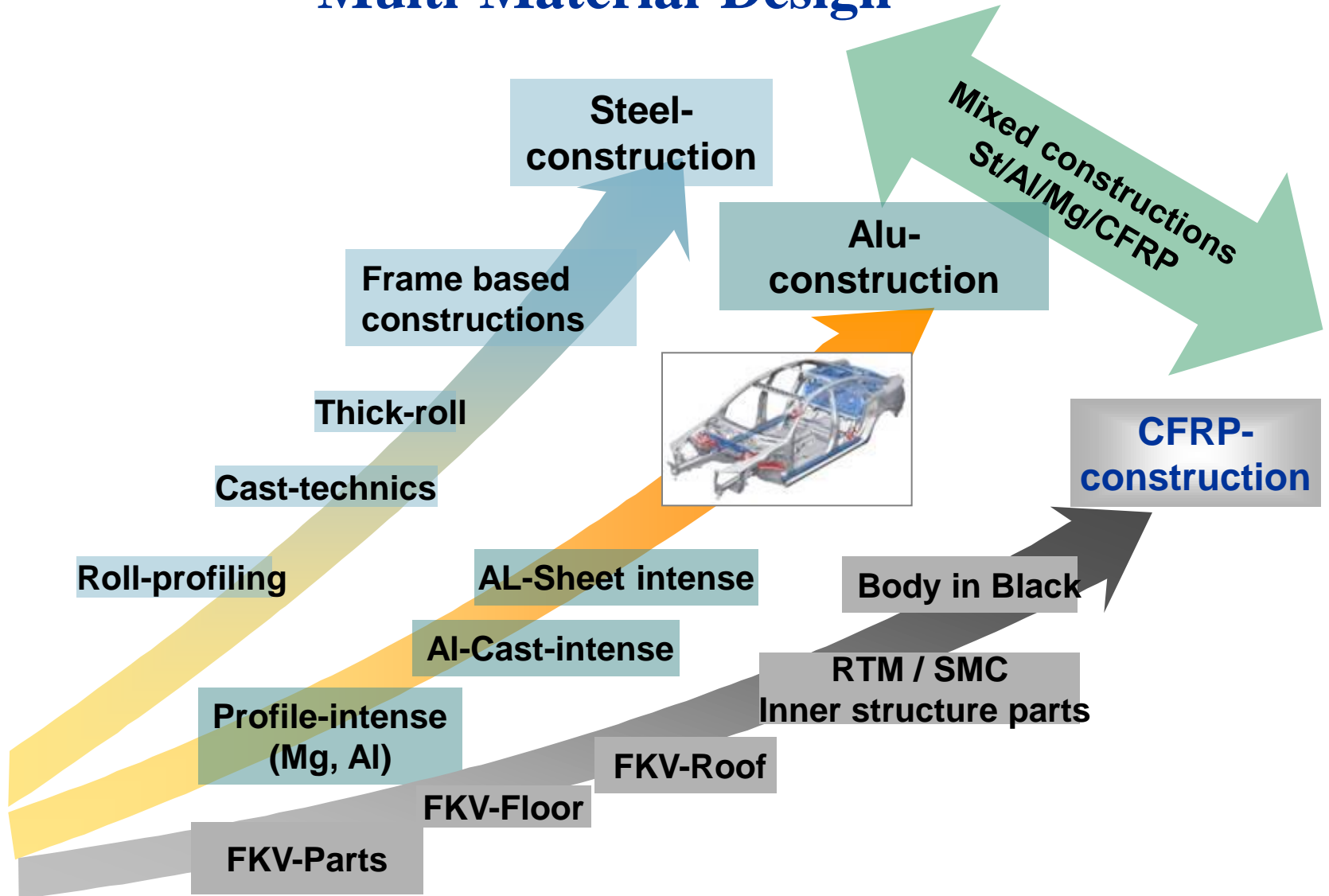
and Special Steel

High-tech Products Jointly Developed with Customers:



The share of mixed constructions will increase in the future

Multi-Material-Design



Hydrogen Fuel Cell Car with minimized battery unit Ultimate Candidate of Next Generation Automobile

Development of

**Conversion of Hydrocarbon to Hydrogen
Catalyst and Removal of Carbon Dioxide**

Finally, hydrogen from water by solar energy

“It is my dream”

**Transportation of hydrogen to the station from
the refinery.**

**Materials for Hydrogen Cylinder,
Hydrogen Storage Materials**

Lithium Ion Battery

High Efficient Motor

Permanent Magnet

Silicon-Steel (Electro-magnetic Steel)

Price, Mass Production

超低損失磁心材料技術領域

Ultra-low Core Loss Magnetic Material Technology Area

Project Leader:

Prof. Akihiro Makino, Institute for Materials Research, Tohoku Univ.

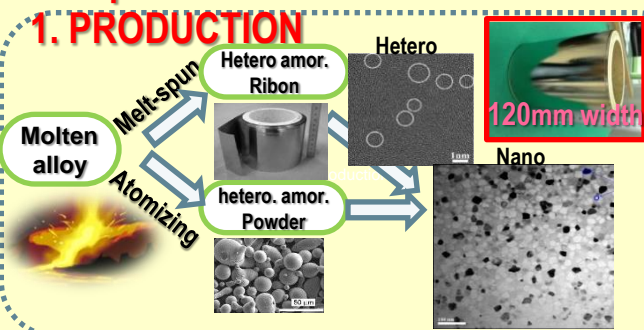
Tohoku Innovative Materials
Technology Initiatives for
Reconstruction

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- To utilize “**Strong Point of Universities & Industries in Tohoku Area**”: **Nanotechnology & Materials Science (Nano&MaterSci)**”
- Placing Tohoku Univ. as COE, to **create new research hubs for Nano&MaterSc based on collaborations among Government-Industry-Academia**
- By developing cutting-edge materials and world-leading technology
→ **to expand the development of Tohoku's material technology industry** and to **reconstruct** from the Great East Japan Earthquake

Concept : Contribution and reconstruction utilizing ultra-low core loss of Fe-based alloy: $Fe_{94.1}Si_{0.6}B_{1.7}P_{2.4}Cu_{1.2}$ (wt.%)

1. PRODUCTION



2. PROCESSING



3. PRACTICAL PROOF

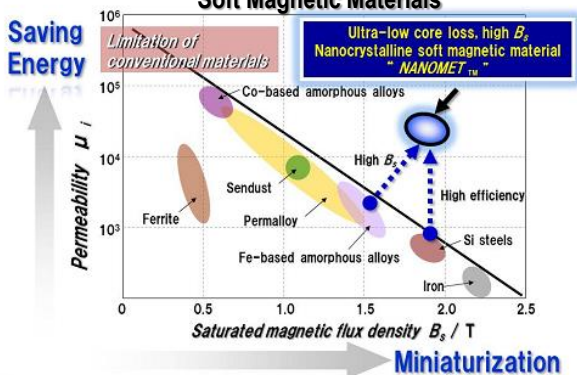
Motors
Transformers
Magnetic parts

4. CONTRIBUTION

Power-saving
Reduce in loss of electricity (from 3.4% to 1%): Corresponding to Power Generations by 7 thermal power stations)
Reconstruction / Generation of Jobs through Venture (Materials development type)

New alloy: NANOMET[®]

Developed via Breakthrough the Common Sense of Soft Magnetic Materials



The road map of the project



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• To expand the development of Tohoku's material technology industry and to reconstruct: Starting from creating Initiative of **Ultra-Low Core Loss Magnetic Material Technology Area** ← **University-Organized Venture (Mater. Develop. Type)**