



# Tire

industry project





## Background

Tires are essential to road and surface mobility, providing the moving surface of many transport vehicles and the only contact point with the ground. Simple in appearance, tires are quite sophisticated products. Tire making involves a complex blend of materials and assembly processes to manufacture the thousands of different products used on equipment ranging from bicycles to earthmovers. A typical tire includes dozens of different components, using more than one hundred primary raw materials that must be precisely processed and assembled to achieve the right balance between many competing factors: grip, energy efficiency, handling, comfort, and noise to name a few.

## What is the Tire Industry Project?

Established in January 2006, the goal of the Tire Industry Project (TIP), working under the umbrella of the World Business Council for Sustainable Development (WBCSD), is to identify and address the potential health and environmental impacts of materials associated with tire making and use. The project is chaired by the three largest tire manufacturers—Bridgestone (Japan), Goodyear (USA) and Michelin (France)—and includes a total of eleven companies representing more than 80% of the world's tire manufacturing capacity.

## Why are these companies undertaking the project?

Tire industry leaders recognize that there are both opportunities and challenges associated with tire manufacturing processes, on the one hand, and sustainable development, on the other. By taking a thoughtful look at these issues, tire industry leaders intend to (1) develop additional knowledge regarding sustainability challenges, and (2) formulate an approach that will help better align industry practices with sustainable growth. These leaders also hope to foster increased awareness and discussion of these issues with key stakeholders (customers, neighbors, associates, legislators and suppliers) in ways that are balanced, interactive and constructive.

In the beginning of this program, the tire industry leaders considered six potential issues for study that had or would have a significant impact on their industry: (1) tire wear particles, (2) tire materials, (3) recycled content of tires, (4) end-of-life tire management, (5) rubber tree plantation development, and (6) common EHS (environment, health and safety) reporting standards. While all are important issues and points of concern for the industry, each subject has different characteristics. Individual companies have already addressed some of these issues. Some can be better managed on a regional basis accounting for unique regional features and regulations. The companies agreed to focus their first efforts on tire wear particles and tire materials because these two issues have more room for further, global, cooperative study. The companies believe that all the cooperative work must be neutral, global and scientifically accurate.





## Key Tire components

- 1 Inner liner
- 2 Radial body plies
- 3 Bead filler
- 4 Bead
- 5 Sidewall
- 6 Steel belts
- 7 Nylon overlay
- 8 Tread

## What is the work program?

The Tire Industry Project aims to address two topics initially: (1) evaluating the potential health and/or environmental impacts of chemicals commonly used in tire making, and (2) developing a better understanding of the fate and possible effects of particles generated during normal tire use and wear (“tire wear particles” or TWP).

During 2006, the Project’s scoping work examined the availability and quality of existing data dealing with these two issues, identified knowledge gaps, and developed a comprehensive plan to fill those gaps in succeeding years. The Project has built a comprehensive, searchable database based on information from scientific literature worldwide, including material in English, German, Italian, Spanish, Japanese and Korean. The more than 3,000 references date from 1895 to the present, although most come from after 1985.

## What has been learned from the scoping work?

A review of more than 50 different chemicals used in making tires showed that many have already been well-characterized by their manufacturers, or will soon be under a variety of regulatory programs in Europe (REACH), and the United Nations High Production Volume (HPV) Challenge Program (United States and Japan). Nevertheless, some of the materials used in tire production have not been fully characterized in terms of their chemical and/or biological properties, as is the case with other chemicals used in other industries. In these

cases, additional work will be needed to fill knowledge gaps and understand possible exposure scenarios that could result from the use of tires by consumers. In reviewing the literature on tire wear particles, the situation is much less clear. The particles themselves are not simply rubber pieces from the tire, but rather an agglomeration of material from the tire along with material from the road and vehicles. The assessment of TWP has received much less attention than the review of chemical constituents; for example, there are no standard methods that define how to collect the particles. Some researchers have estimated that these particles constitute 2-10% of the fine particulate matter (PM10) in the air.

However, these early results are of limited use because of concerns about the techniques used to identify the particles, a lack of standards in analytical techniques, a lack of standard collection methods, as well as seasonal effects. In short, it will take considerable effort to collect the right particles and understand their properties and dispersion in the environment.

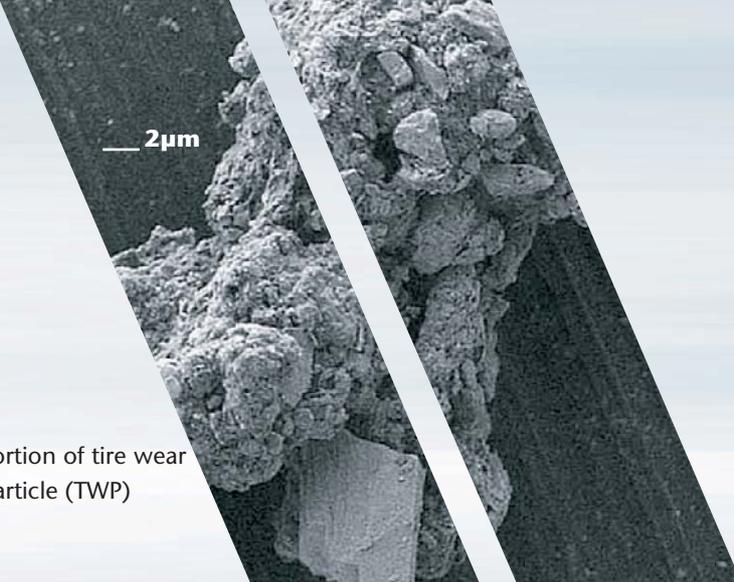
## Next steps

In 2007 and 2008, field research will focus on collecting tire wear particles and characterizing their physical and chemical properties. The particles will be collected in both the lab and on roads using special sampling equipment placed behind a vehicle’s tire, where the small particles are pulled into a vacuum system for later analysis.

Tasks have been identified to help fill the knowledge gaps, including:

- The collection of tire wear particles under real environmental conditions
- TWP chemical characterization
- TWP environmental and biological leaching tests
- TWP aquatic toxicity testing
- TWP measurement in the environment
- Human and ecological risk assessment
- TWP fate and transport model parameter development





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Portion of tire wear particle (TWP)

## Why is the project carried out under the auspices of the WBCSD?

This program follows on a string of important sector based programs at the WBCSD, including those dealing with cement, forest products, electrical utilities, mining and mobility. As a diversified forum bringing together leading companies from around the world in their fields, the WBCSD lends experience and a forum for the free exchange of ideas to such industry-led projects; its impartiality is key.

## Who is involved?

Companies forming the project team include: Bridgestone Corporation (Japan), Continental AG (Germany), Cooper Tire & Rubber Company (USA), The Goodyear Tire & Rubber Company (USA), Hankook Tire Co. Ltd. (Korea), Kumho Tire Co. Inc. (Korea), Groupe Michelin (France), Pirelli Tyre SpA. (Italy), Sumitomo Rubber Industries, Ltd. (Japan), Toyo Tire & Rubber Co. Ltd. (Japan), and The Yokohama Rubber Co. Ltd. (Japan).

## An independent “referee”

A small, independent assurance group will help to ensure that the project has the correct focus and processes and a balanced approach. It will also act as a referee in case of disagreements between the consultants and the companies. Members are drawn from several different geographic regions and professional backgrounds:

- Dr. Meshgan Mohd Al Awar, Director, Research and Studies Centre, Dubai Police Academy (Dubai, UAE)
- Prof. Michel Savy, Professor, Paris-Val de Marne University and Ecole Nationale des Ponts et Chaussées (France)
- Dr. Raman Letchumanan, Assistant Director, ASEAN Environmental Secretariat (Malaysia)
- Prof. Akio Morishima, Professor Emeritus, Nagoya University and Professor, Sophia University (Japan)

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- Prof. John Spengler, Akira Yamaguchi Professor of Environmental Health and Human Habitation, Department of Environmental Health, Harvard University (USA)

## What is the timetable?

The scoping work was carried out in 2006. The CEOs met to review results in February 2007 and authorized more detailed studies. The next phase of the work is expected to be completed in 2008, and additional CEO review will be made at that time.

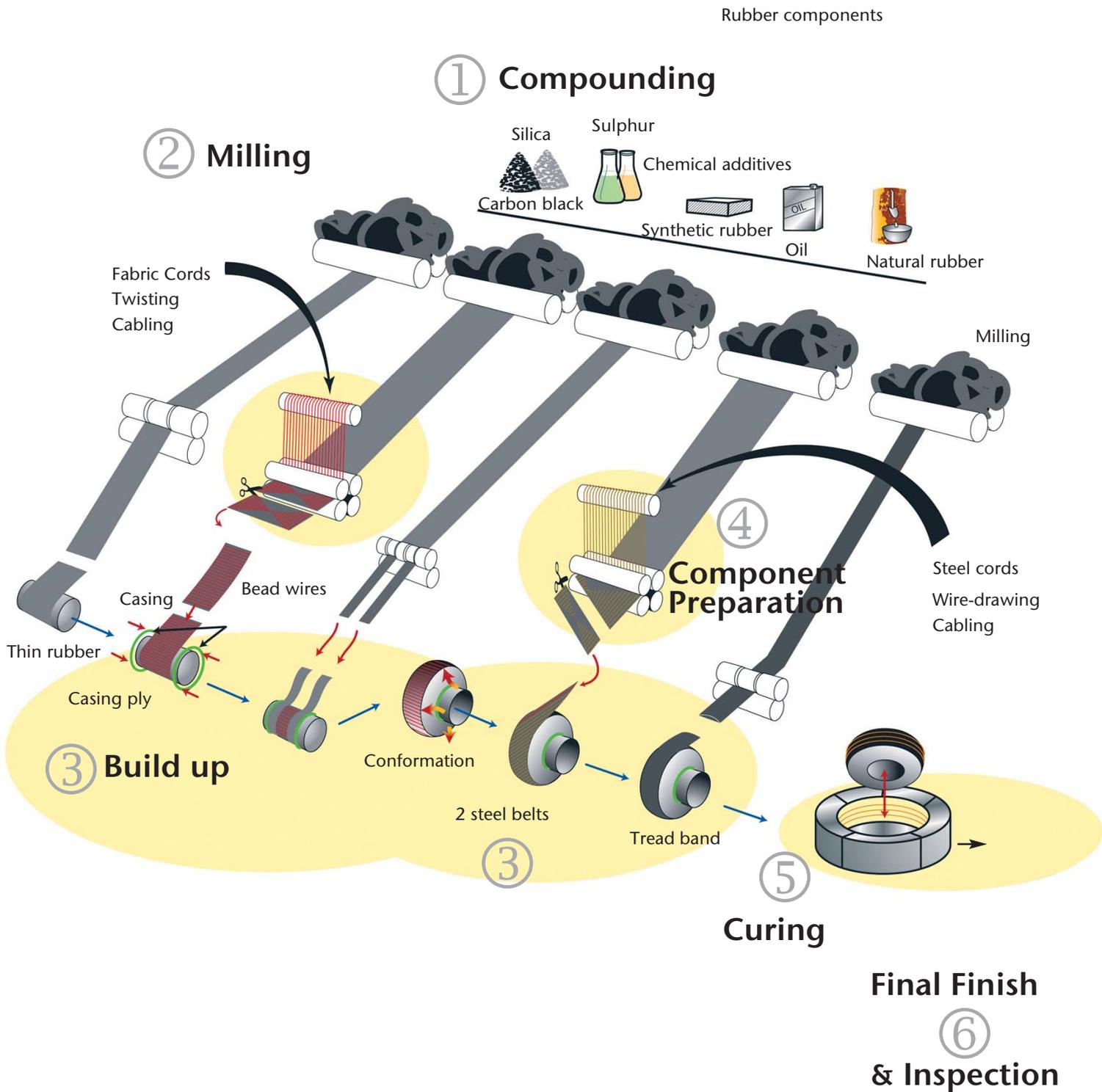
## What will it cost?

The initial budget for scoping studies in 2006 was US\$ 1 million, funding consultant’s work and WBCSD program management. In the next phase an additional US\$ 2 million has been authorized to collect the particles and understand more about their chemical, physical and ecological properties. The budget in subsequent years will be set following an analysis of the work completed and new research goals.



# Key steps for making Tires

- 1 Compounding
- 2 Milling
- 3 Build up: Tire machines where beads and rubber components are precisely placed
- 4 Steel belts for radial tires (most common passenger car tire)
- 5 Curing
- 6 Final Finish & Inspection



## About the WBCSD

The World Business Council for Sustainable Development (WBCSD) is a unique, CEO-led, global association of some 200 companies dealing exclusively with business and sustainable development. The Council provides a platform for companies to explore sustainable development, share knowledge, experiences and best practices, and to advocate business positions on these issues in a variety of forums, working with governments and non-governmental and intergovernmental organizations.

Our **mission** is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our **objectives** include:

- *Business Leadership* – to be a leading business advocate on sustainable development;
- *Policy Development* - to help develop policies that create framework conditions for the business contribution to sustainable development;
- *The Business Case* - to develop and promote the business case for sustainable development;
- *Best Practice* - to demonstrate the business contribution to sustainable development and share best practices among members;
- *Global Outreach* – to contribute to a sustainable future for developing nations and nations in transition.

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