



eco-innovation
WHEN BUSINESS MEETS THE ENVIRONMENT



The implication of ECO-RUBBER project

eco
rubber
— urban environment —

FINAL CONFERENCE ECOTURF PROJECT

DECEMBER 14, BRUSSELS

MARTA VALERO (marta.valero@ibv.upv.es)



Coordinator



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2. Project objectives
3. Urban product development: recycled rubber bollards
4. Proposal of an EU-ECOLABEL
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INTRODUCTION

The 27 countries of the EU had to dispose of 3.4 million tones of tyres in 2007 alone, according to the Tre and Rubber Manufacturer's Association. Only 38% of those were recycled.



INTRODUCTION

In the '50s only New York was considered as an urban agglomeration.

In 2015 is estimated that the **urban MACROCITIES** will rise until **23**.



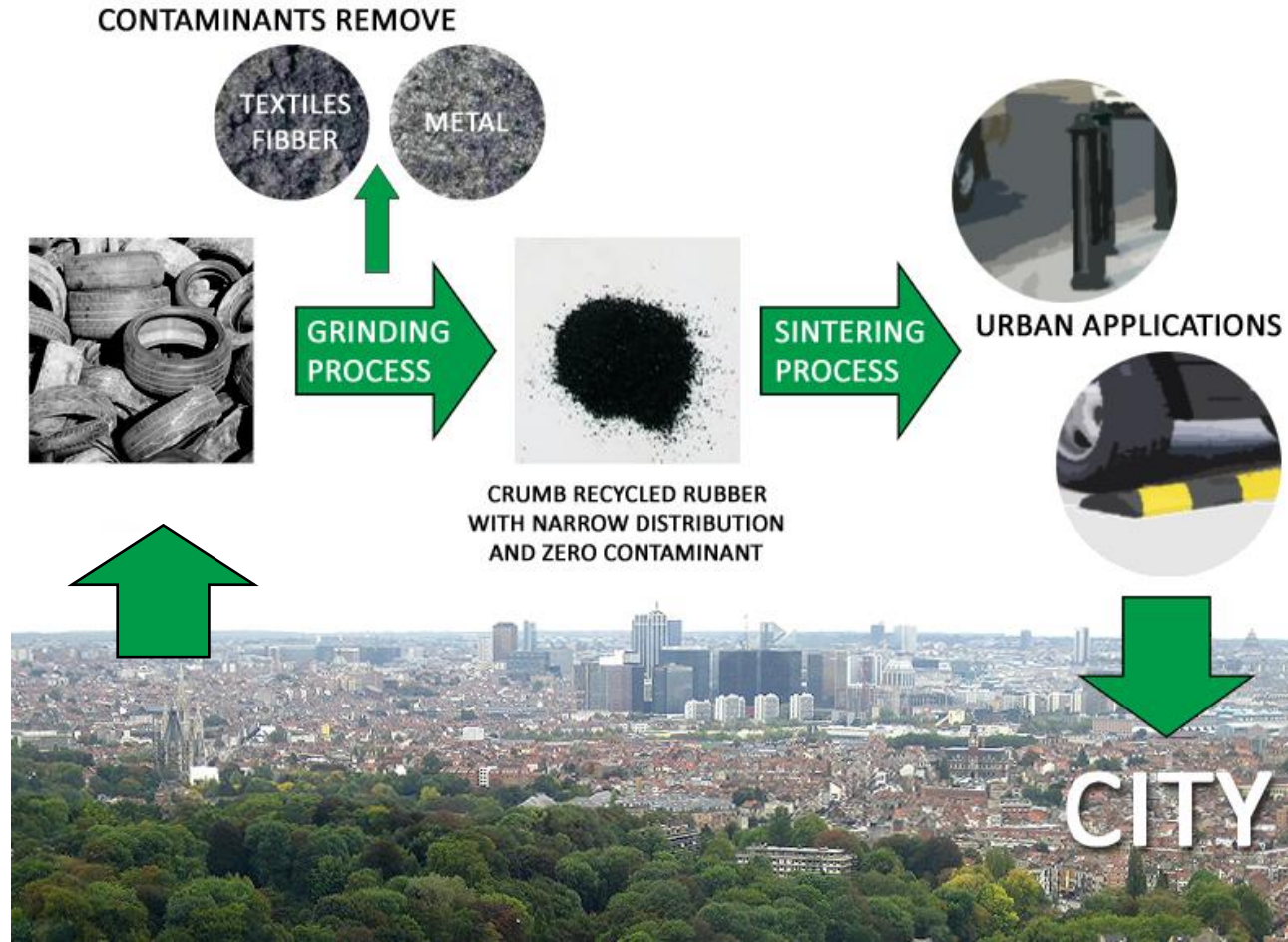
In addition in 2030 the **60%** of the global population will live in **urban areas**.



INTRODUCTION

MAIN GOAL OF THE ECORUBBER PROJECT

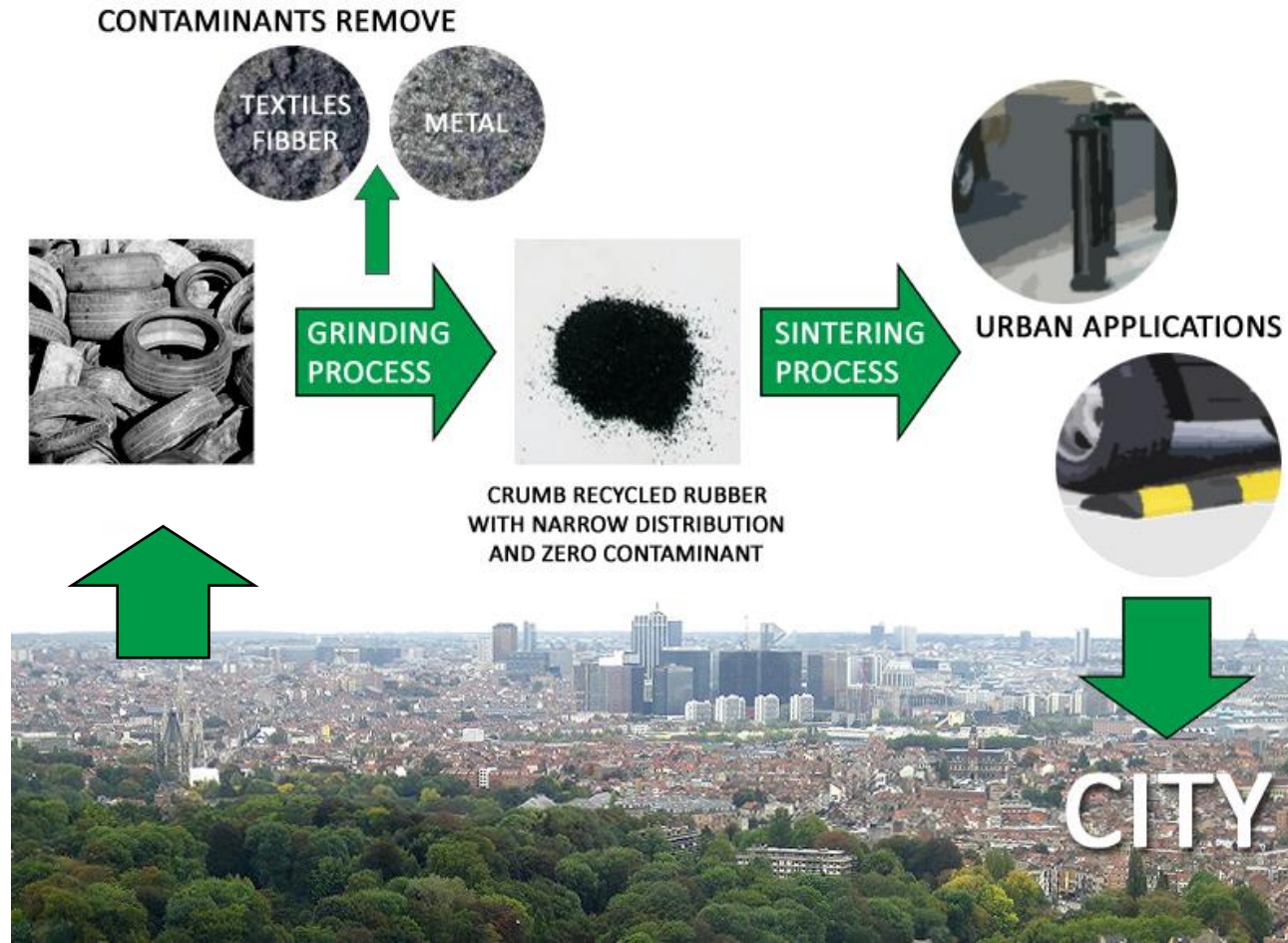
ECO-RUBBER:
Innovative used tyres recycling and rubber sintering process for eco-friendly urban equipment fabrication



INTRODUCTION

MAIN GOAL OF THE ECORUBBER PROJECT

The main goal is to adapt the current industrial rubber recycling process to supply **innovative recycled rubber urban furniture products** manufactured by an innovative sintering process as an alternative to virgin rubber, wood or concrete products.



INTRODUCTION

ECORUBBER CONSORTIUM

RECIPNEU is a rubber recycling company,



BERLÁ is a sintering manufacturer producing rubber technical products,



IBV, a RTD institute with expertise in product development, biomechanics and emotional engineering, plays the role of end user.



AIMPLAS, project coordinator, is a RTD institute with huge expertise in materials formulation, rubber processing (sintering), and pilot plant installation.



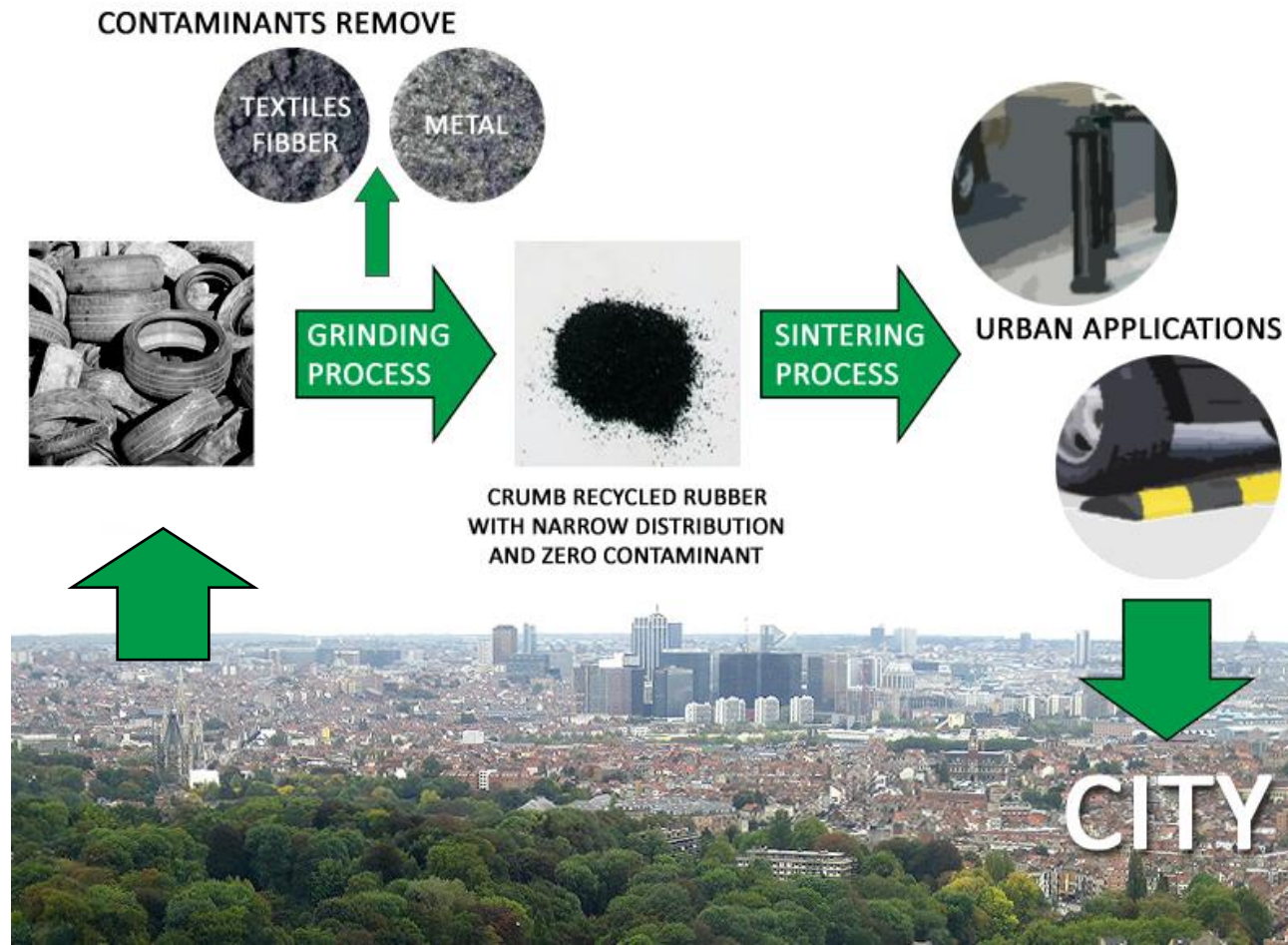
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PROJECT OBJECTIVES

MAIN GOAL

The main goal is to adapt the current industrial rubber recycling process to supply **innovative recycled rubber urban furniture products** manufactured by an innovative sintering process as an alternative to virgin rubber, wood or concrete products.

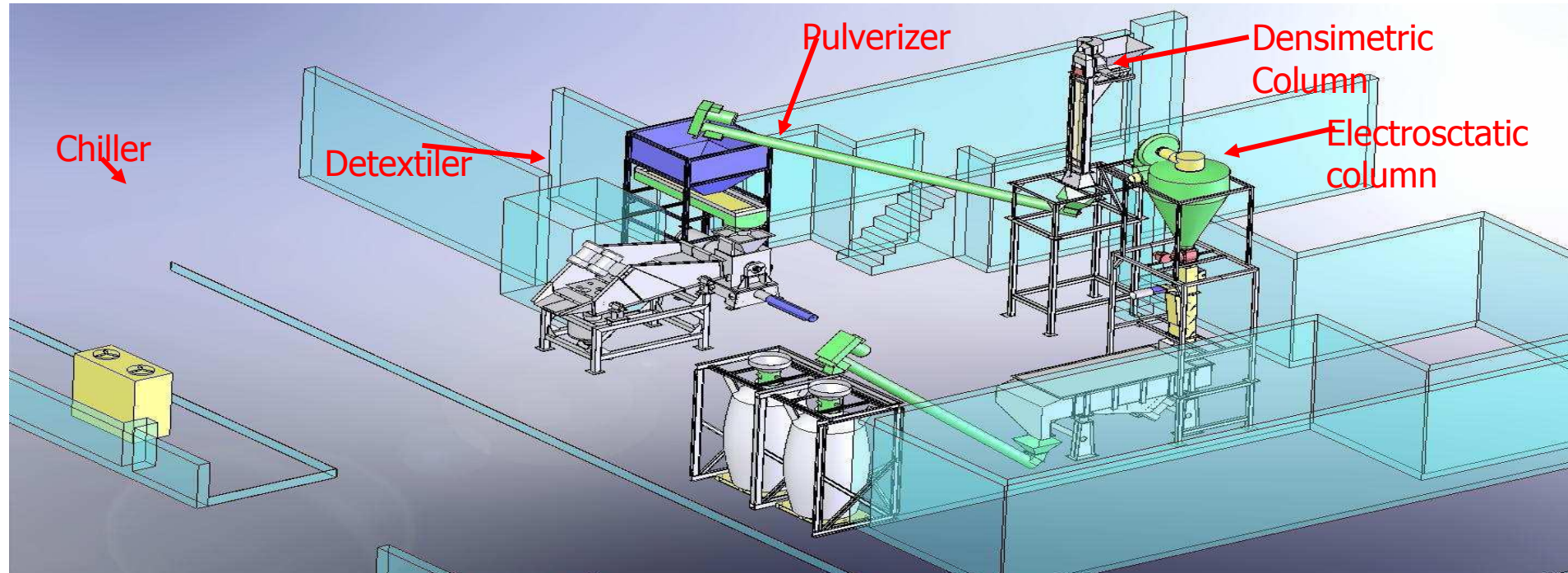


PROJECT OBJECTIVES

OBJECTIVE: GRINDING PROCESS OPTIMIZATION

An adapted and improved grinding process:

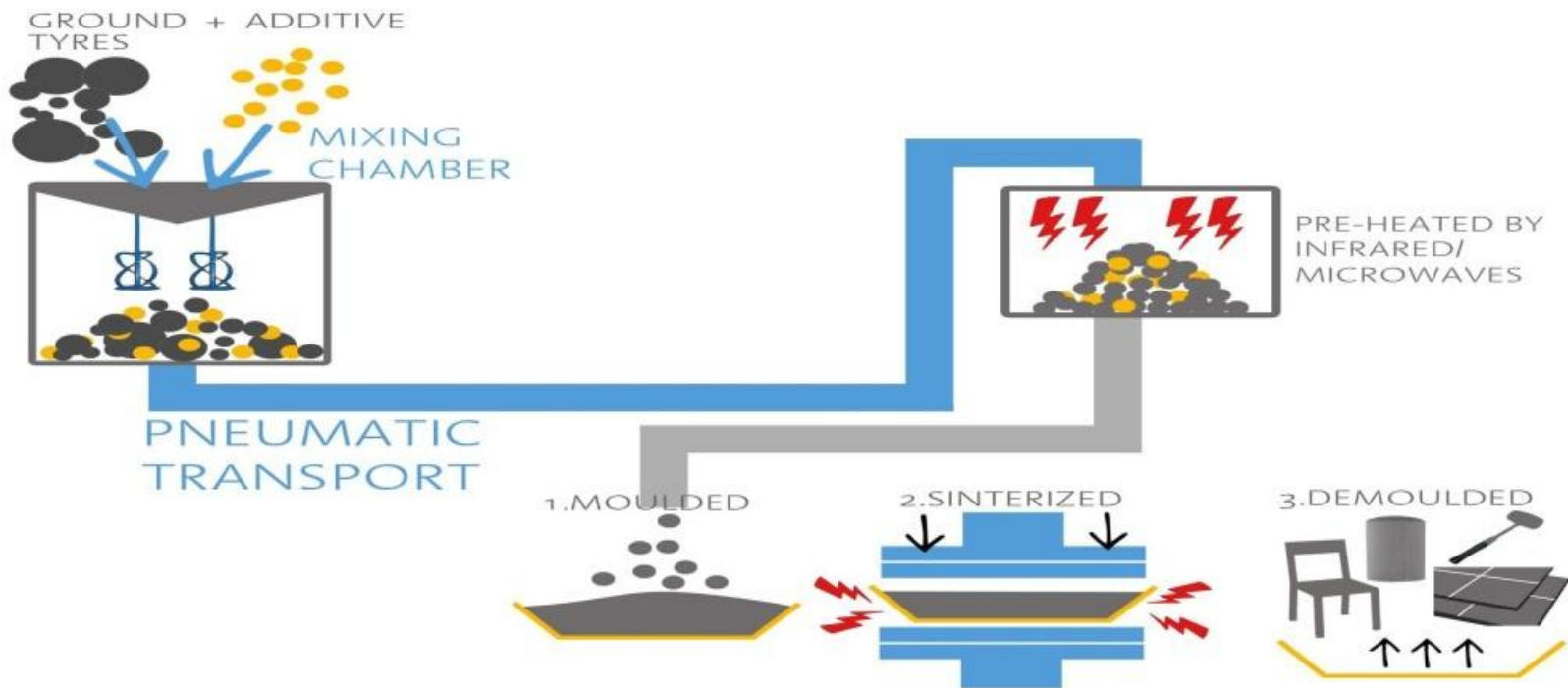
- To obtain the targeted **particle morphology** and **zero contaminants**.
- To improve the morphologies synergy blends to obtain **recycled** rubber with enhanced properties.



PROJECT OBJECTIVES

OBJECTIVE: SINTERING PROCESS OPTIMIZATION

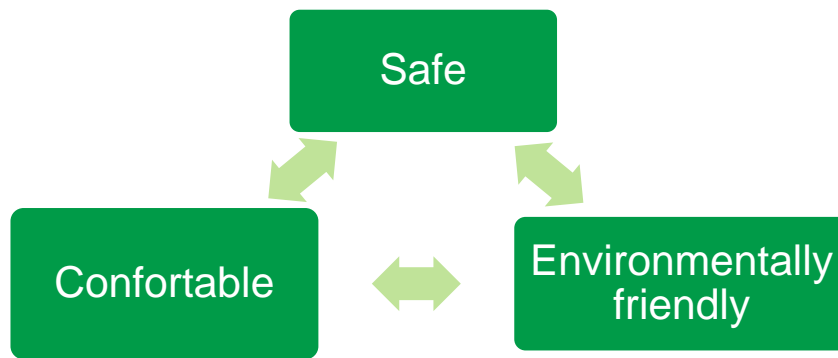
An optimized sintering process including dosing chamber and pre-heated phases.



PROJECT OBJECTIVES

OBJECTIVE: URBAN INNOVATION

The selected urban innovation is representative of the advantages of an application made of recycled rubber.



BOLLARD

Material elasticity would reduce the risk of an injury as a result of hits or accidents



PROJECT OBJECTIVES

OBJECTIVE: PREDICT AND ASSESS THE FINAL PRODUCT PERFORMANCE

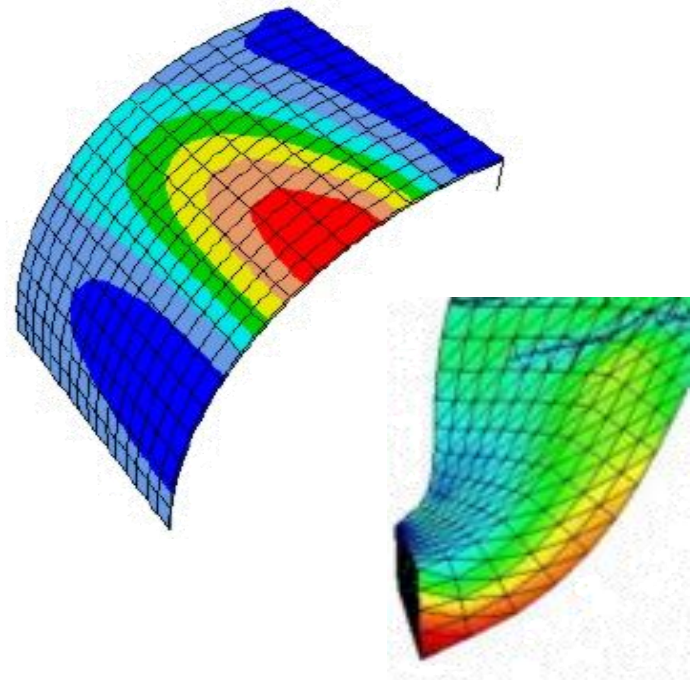
Aid the introduction of simulation programs into the design process of recycled products that enables to predict and assess the final product performance.

Material
characterization

Generation of the
finite element model

Test performed

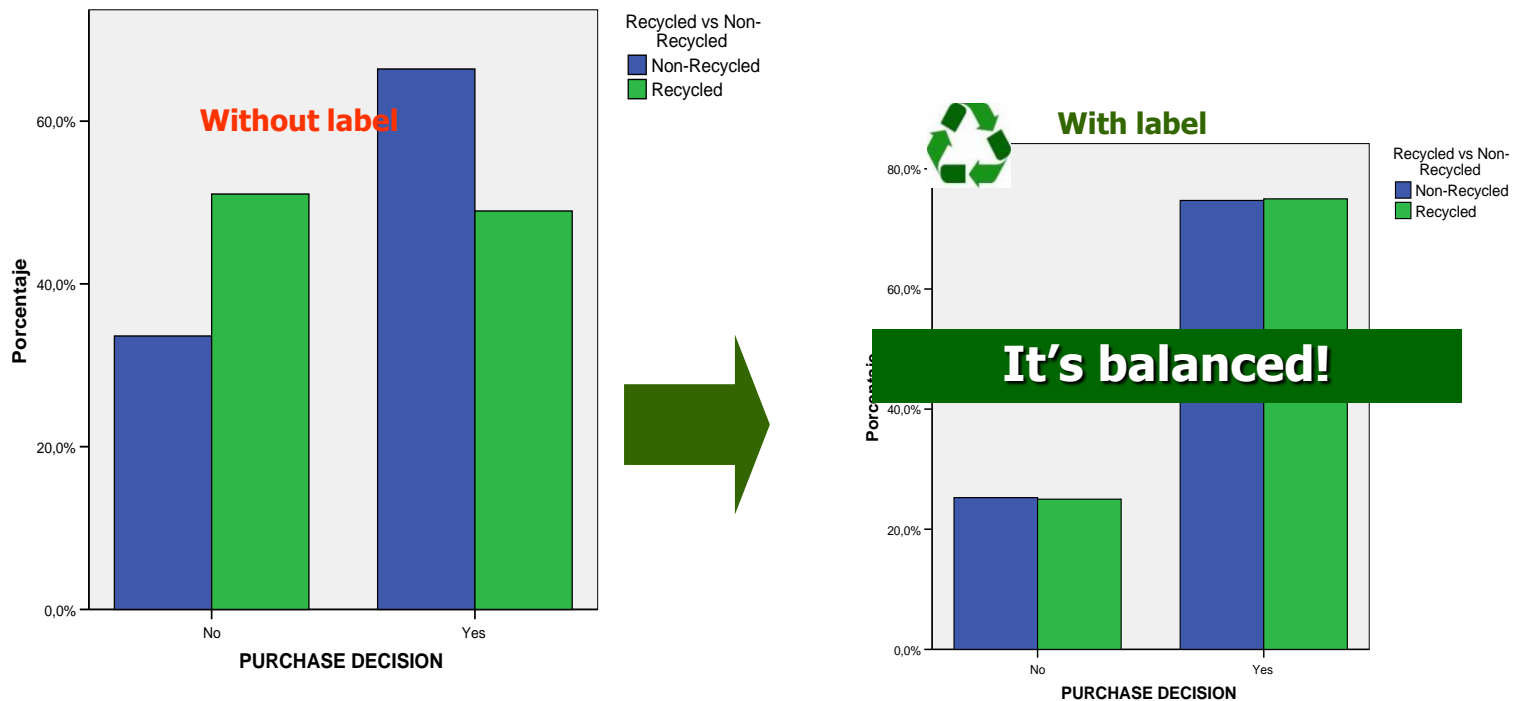
Validation



PROJECT OBJECTIVES

OBJECTIVE: ELIMINATE USER ATTITUDE BARRIERS

An Ecolabel stamp for the developed products will eliminate user attitude barriers to the use of urban furniture made of recycled rubber.



Bar chart of quality perception for recycled vs. non recycled.

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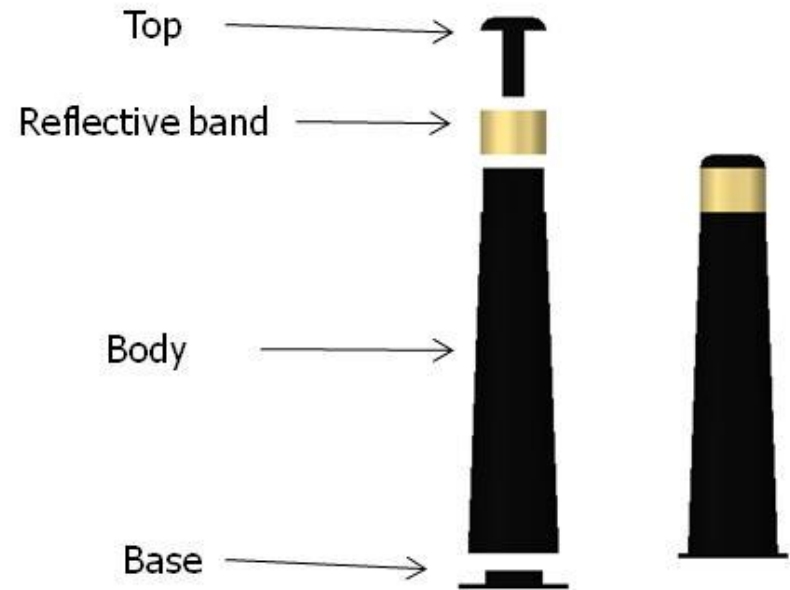
Urban product development: recycled rubber bollards

DESIGN OPTIONS AND SUBJECTIVE PERSPECTIVE

Functional specifications



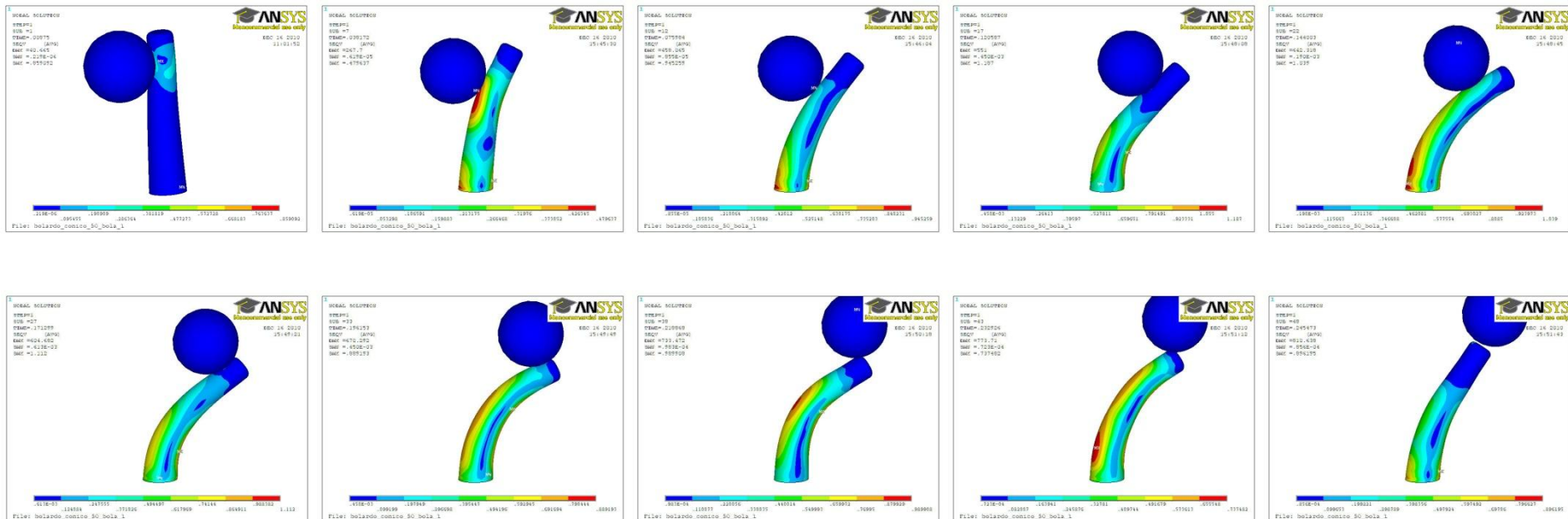
Emotional requirements:
user preferences



Urban product development: recycled rubber bollards

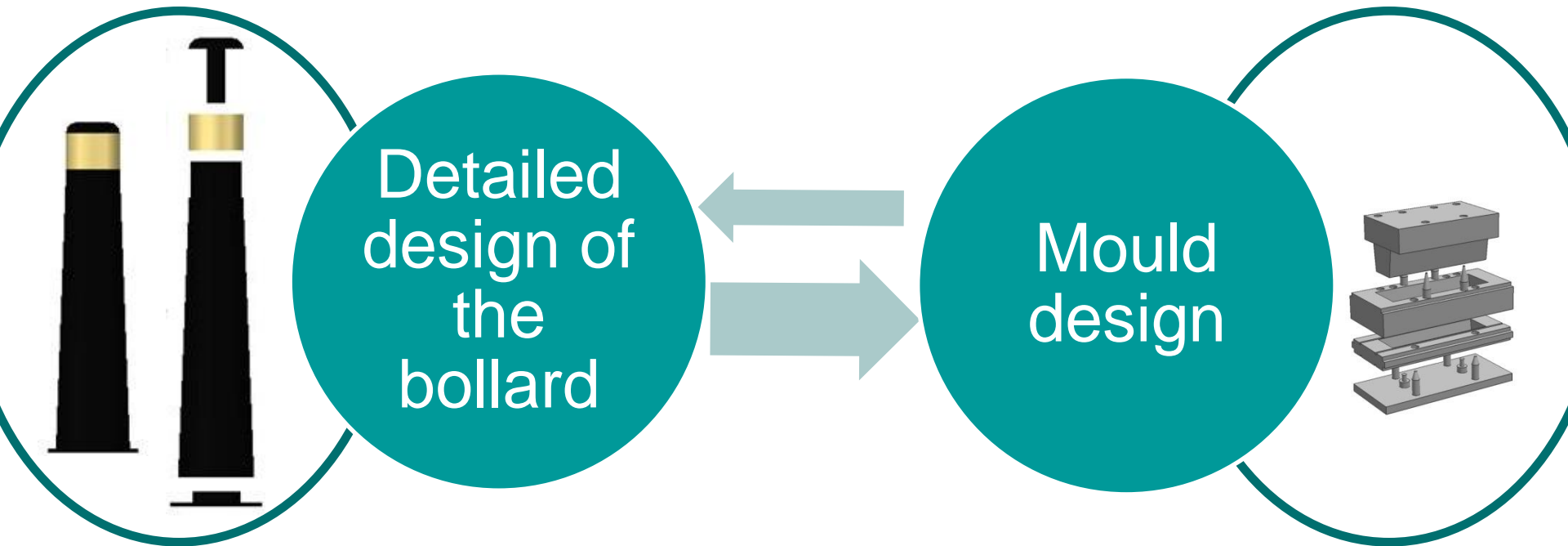
SIMULATION OF RECYCLED RUBBER PERFORMANCE

Total deformation, sequence of the simulation.



Urban product development: recycled rubber bollards

MOULD DESIGN



Urban product development: recycled rubber bollards

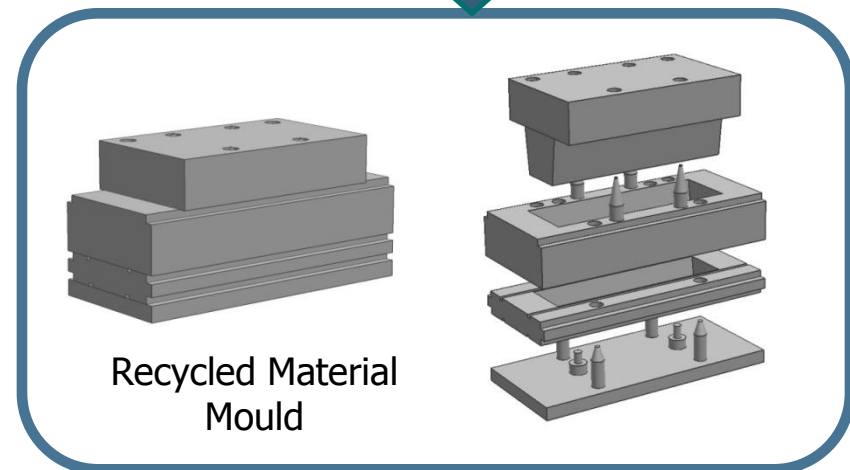
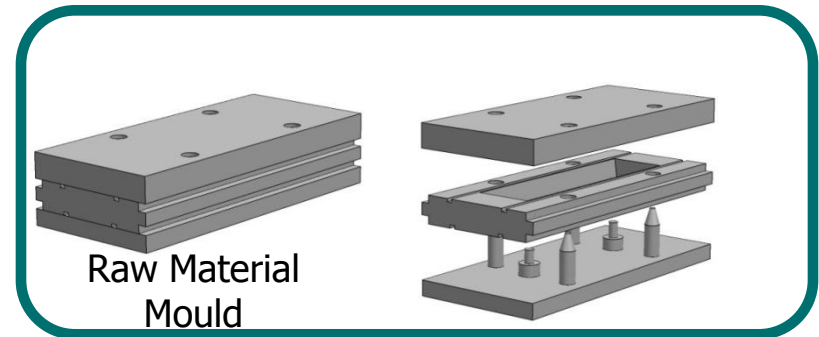
MOULD DESIGN



- A NEW DESIGN OF THE MOULD IS NEEDED:
 - Male – Female Strategy
 - Higher Cavity

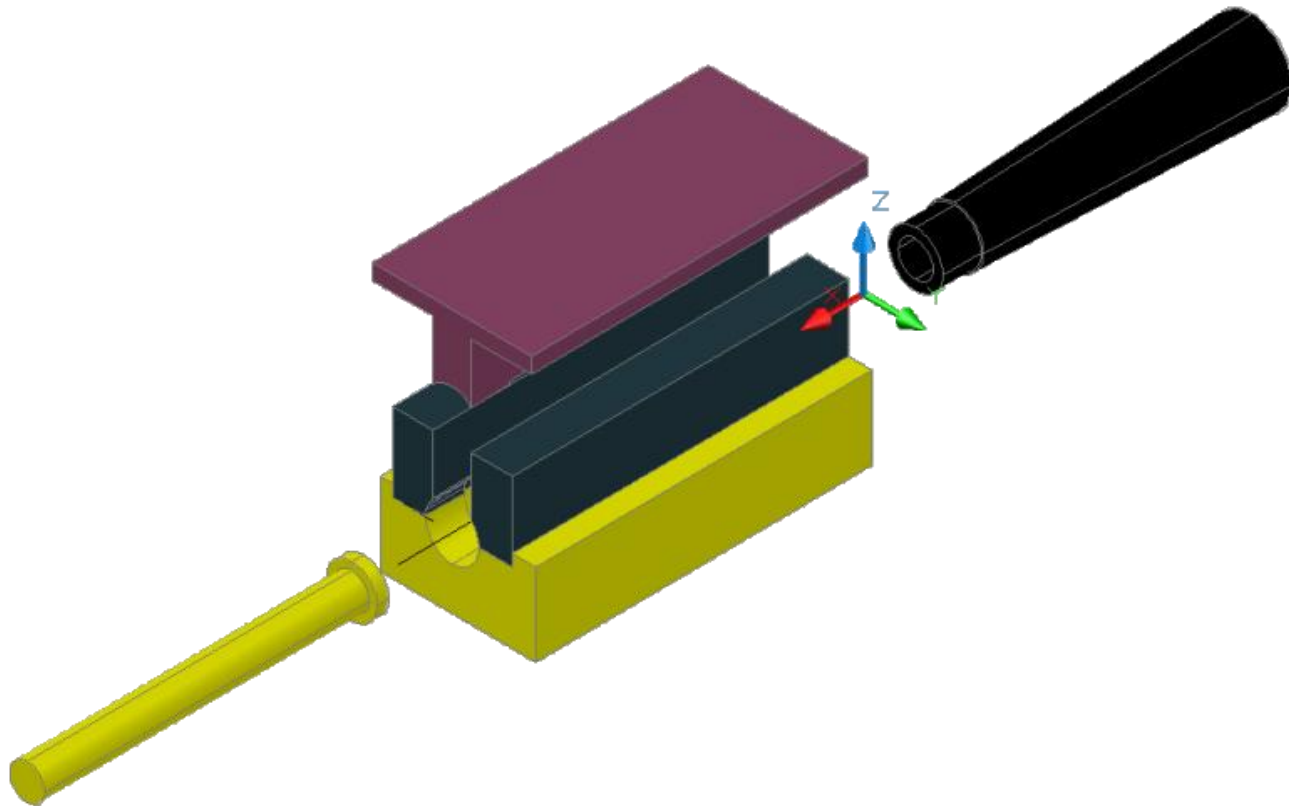
It is necessary take into account the recycled rubber properties:

- Apparent density
- Necessary volume
- Plastic behaviour



Urban product development: recycled rubber bollards

MOULD DESIGN



Urban product development: recycled rubber bollards

PRODUCT BENEFITS

HIC

Safe



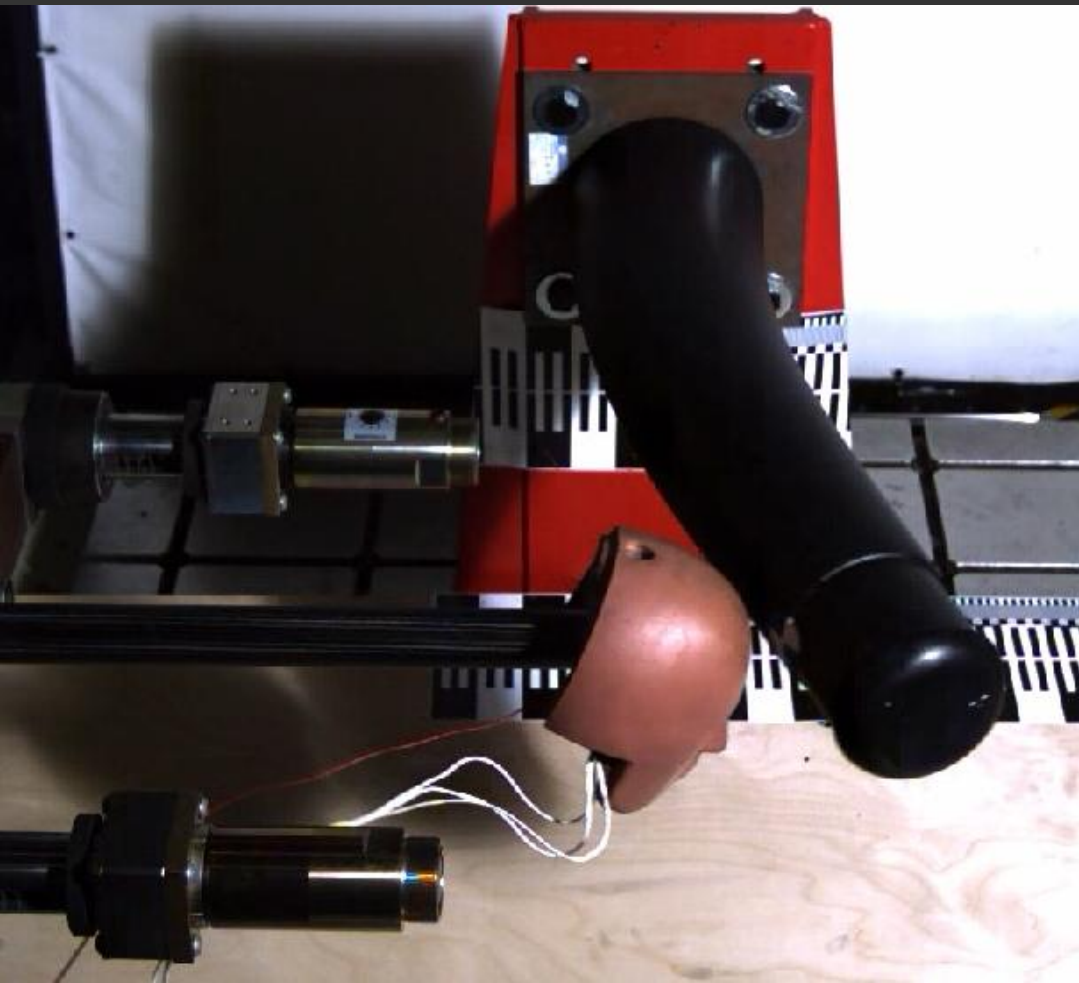
Environmentally friendly

This label will help citizens to value the product as **environmentally friendly**.



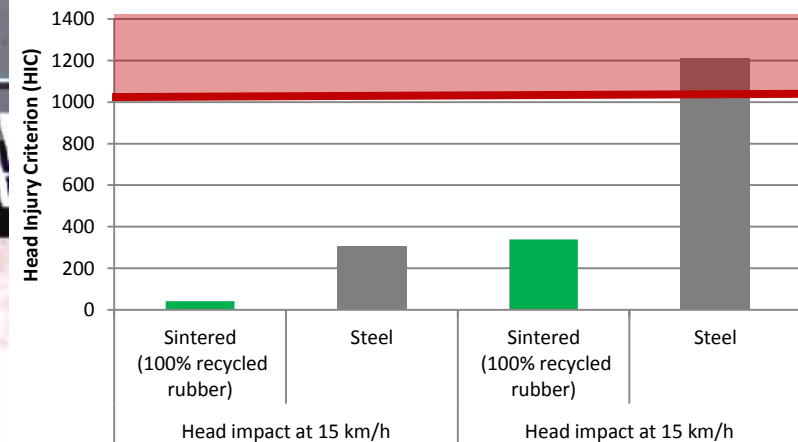
Urban product development: recycled rubber bollards

PRODUCT BENEFITS: SAFER BOLLARDS FOR CITIZENS



HIC (Head Injury Criterion) is a measure of the likelihood of injury caused by an impact.

It is recommended a value of HIC below 1000. Above this value, one sixth of the population will suffer life-threatening injuries.



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PROPOSAL OF AN EU ECOLABEL FOR RECYCLED RUBBER PRODUCTS

REVISION OF EXISTING ECO-LABELS



Australia



Taiwan



China



Catalonia (Es)



Holland



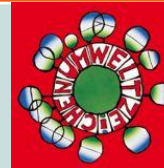
New Zealand



Japan



Singapore



Austria



Bra Miljöval

Sweden



USA



Korea



Germany



France



Czech Rep.



Canada



Thailand

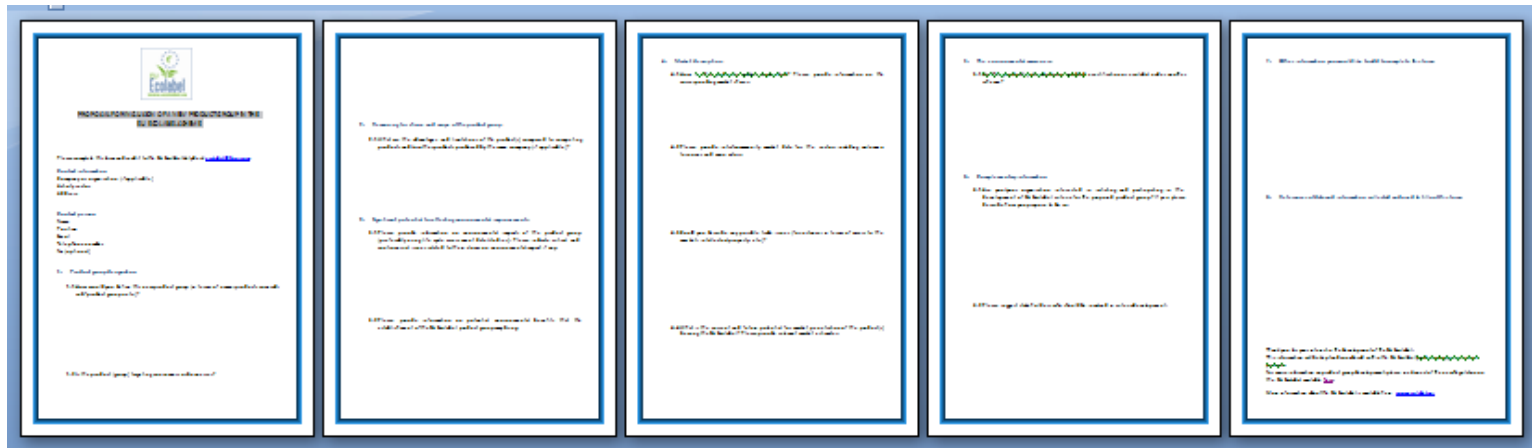


Croatia



Scandinavia

PROPOSAL OF AN EU ECOLABEL FOR RECYCLED RUBBER PRODUCTS



Name: Products made of recycled rubber
Products covered: Applicable to rubber products that are partially or fully made of recycled rubber.

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5. **Conclusions**

Conclusions

From an **environmental** point of view, several improvements can be achieved by this innovation.

1. The project has important environmental benefits: 80-90 % in material production when substituting the original process of producing SBR with the production of crumb rubber from tyres. Regarding manufacturing process related indicators, the reduction ranged between 30-50 % as it was obtained on previous project.
2. It also fosters to **increase waste recycling rates of used tyres** and therefore improves the environmental performance of the industrial process.
3. Moreover, **sintered rubber could re-enter the recycling process proposed.**

The bollard manufactured within ECO-RUBBER will **show the important advantages of the use of recycled-rubber in the urban furniture sector**, so this will be the starting point of a considerably increment in urban furniture recycled-rubber demand.

Concerning tyre collector and grinding plants, a **new market** will be developed increasing their profits and competitiveness.

On the other hand, the **rubber technical manufacturers will be able to replace virgin rubber by recycled crumb rubber** decreasing their dependency of petrol derived materials and consequently decreasing costs.

The work described is conducted in the framework of the Eco-Rubber project that is within the framework of the subprogram Entrepreneurship and Innovation Programme (EIP) – Eco-Innovation. Contract number: ECO/08/239112/SI2.535300

THANK YOU!



www.eco-rubber.eu