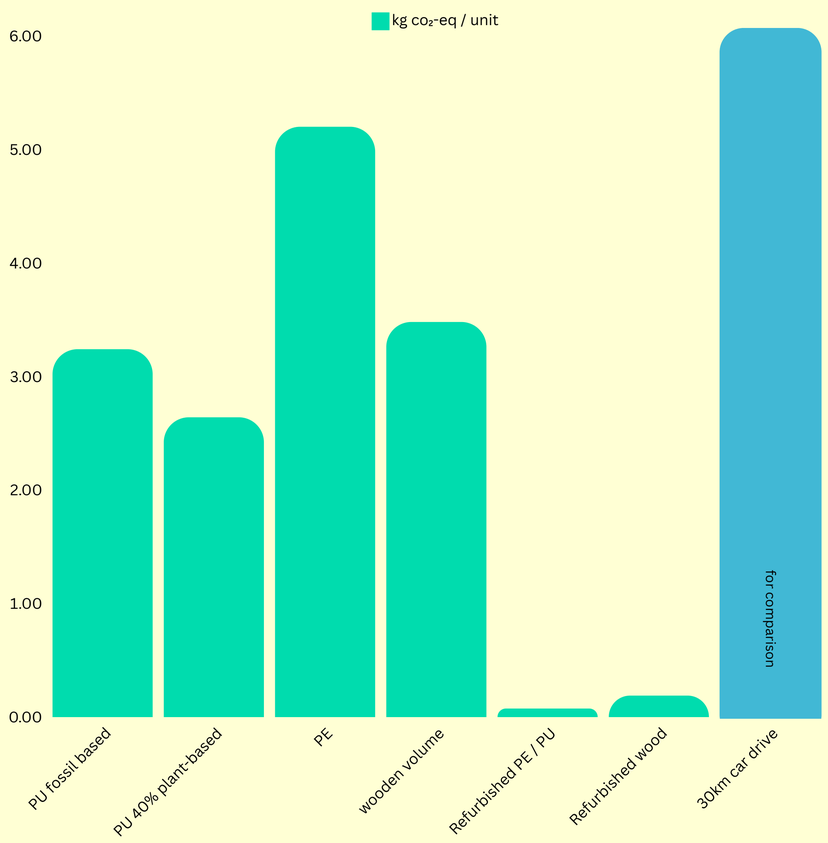
AN INITIAL ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF CLIMBING HOLDS

Introduction We believe that companies, as important players in economy and society, must take great responsibility for the transformation to a socially and ecologically equitable world. Part of this is analysing production processes and outputs and finding ways to minimize their impact: This study therefore focuses on the environmental impact of climbing holds and should help to develop possible strategies for a more ecological production of climbing holds. However, it is also evident that simply increasing efficiency and modernizing climbing hold production will not suffice. We need structural changes to our way of production and lifestyle, such as e.g sufficiency and consistency strategies.

This assessment is largely based on the study “HoldingGrips LCA / PCF” by Pforzheim University which investigated the environmental impact of the products from holdingGrips GmbH and its production partner HOLU Production GmbH. The main objective of the project was to provide concrete answers to the questions: What is the environmental impact of a climbing hold? Which materials have the most significant impacts?

Method Impacts of materials were modeled using the Life-Cycle-Assessment-Software Umberto and the ecoinvent database. The impact assessment method ReCiPe 2016 Midpoint (H) was applied. Scope: Cradle-to-grave. Data that was not found in the ecoinvent database was provided from interviews with holdingGrips and research articles.

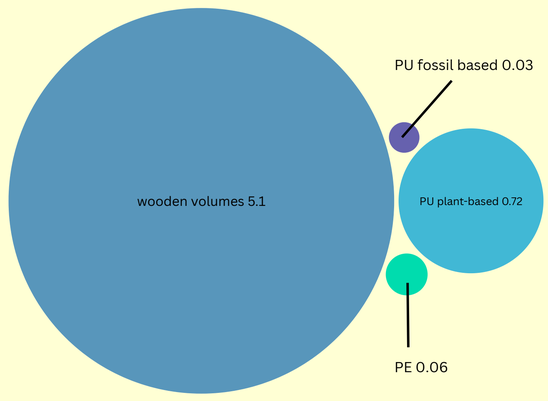
CO_2 emissions of different hold materials



Refurbishing is extremly beneficial for all product types

Unit [kg material / hold]: PU fossil based 0,4; PU 40% plant-based 0,4; PE (filled with aluminium oxide) 0,85; wooden volumes 2; Refurbished PE / PU 0,1; Refurbished wood 0,2. Refurbishing: Inputs and effects should be added to those of the newly manufactured products and then reflect an entire life cycle. Car: 6l/km gasoline.

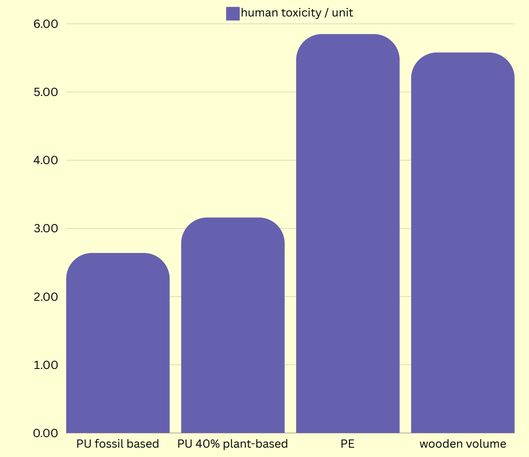
Landuse of different hold materials



Wooden volumes and plant-based PU require much more landuse compared to conventional PU & PE

Unit [kg material / hold]: PU fossil based 0,4; PU 40% plant-based 0,4; PE (filled with aluminium oxide) 0,85; wooden volumes 2. Landuse [Annual crop eq y/unit];

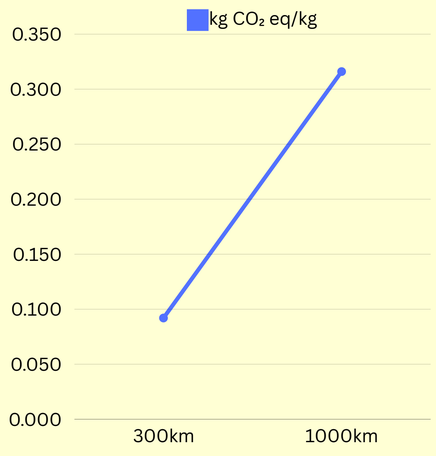
Human toxicity of different hold materials



Human toxicity occurs in the upstream chain and processing of the material, not during use in the climbing gym.

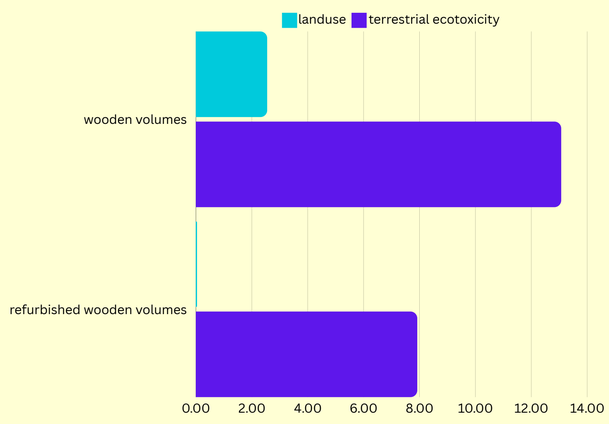
Unit [kg material / hold]: PU fossil based 0,4; PU 40% plant-based 0,4; PE (filled with aluminium oxide) 0,85; wooden volumes 2. Human toxicity [kg 1,4 DB eq/unit].

CO_2 emissions of refurbished products in realtion to transportation distance



The shorter the transportation, the lower the CO_2 emissions for refurbished products (direct correlation)

Refurbishing of wooden volumes is especially beneficial with regard to landuse



Landuse [Annual crop eq y/kg]; Terrestrial Ecotoxicity [kg 1,4 DCB eq/kg]

The very **greatest** environmental impact of climbing holds is due to their **upstream chain**.

approx. **90%**

Most of this is attributable to the energy required to melt polymers.

Emissions of climbing holds in relation to climbing gyms

Initial purchase climbing gym (10.000 holds)
40 t CO_2-eq

Annual hold purchase (450 holds)
1.8 t CO_2-eq

Total hold purchase since 1990 for all gyms in Germany
33.000 t CO_2-eq
corresponds to what 100 people emit in the same time span

Remarks During the project, a number of assumptions and estimates had to be made - the results are therefore subject to certain uncertainties. The lifespan of the various products is not shown here, as this varies massively depending on use, material and manufacturer (however, different scenarios can simply be taken into account by dividing the respective values by the lifespan).

Literature
Endres, M.; Endres, S.; Roland, J.; Schütz, M. E. (2024): HoldingGrips LCA / PCF, report of the student project in the focus subject Technology, Pforzheim University, Pforzheim.
Knabe, Sebastian (2024): Personal communication with Sebastian Knabe, CEO of HOLU and holdingGrips from April to September 2024.
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Special thanks to University Pforzheim, Prof. Dr.-Ing. Claus Lang-Koetz, Prof. Dr.-Ing. Jörg Woidasky and the students of the student project “HoldingGrips LCA /PCF”

CONTACT
Sebastian Knabe
sebastian@holding-grips.com
+49 151 26969990

VISIT US
at booth A7-474 and A7-470

HOLU Production · holdingGrips · Evolution Volumes & Holds