



Les – naraven material v svetu konkurenčnosti

Les od nekdaj spremlja človeka kot vsestranski material. Danes se v družbeno odgovornih okoljih, kjer postajajo trajnost, obnovljivi viri in ekološka ozaveščenost ključni dejavniki, spet vse bolj uveljavlja, je konkurenčen material ter ključen za doseganje krožnosti.

Les zaradi svojih prednosti izstopa pri pohištvu in notranji opreми, kjer je praktično brez konkurence. Zelo uspešno se uporablja v gradbeništvu, kjer so kot trajnostni material priljubljeni različni lesni kompoziti. Mehanske lastnosti lesa in lesnih kompozitov, kot so visoka trdnost glede na maso oz. gostoto, enostavnost obdelave ter dobre ali celo izjemne izolacijske lastnosti, omogočajo njihovo široko uporabo pri gradnji stanovanjskih in drugih objektov. Les lahko konkurira betonu in jeklu celo pri gradnji najvišjih objektov.

Pomembno mesto, zlasti iz manj kakovostnih surovinskih virov, zaseda v embalažni industriji, kjer vse več podjetij prehaja iz polimerov na lesene ali papirne alternative embaliranja.

Konkurenčnost lesa je nizka na več področjih, kjer lesni kompoziti zaostajajo za kovinami, polimeri in umetnimi kompoziti. V gradnji v ekstremnih pogojih les zaostaja za visokozmogljivimi materiali, kar velja tudi za več področij športne opreme, zlasti zaradi občutljivosti na vlago, UV-žarke in variabilnih lastnosti. V pakirni industriji še vedno prevladuje plastika, zlasti zaradi nižjih stroškov in fleksibilnosti predelave in uporabe. Tako bi lahko lažji in trajnejši lesni materiali nadomestili plastiko v embalaži, medtem ko bi hibridni kompoziti združili estetiko lesa z mehanskimi prednostmi drugih materialov. V zahtevni avtomobilski in letalski industriji ga v pri-

merjavi s kovinami in visokotehnološkimi polimeri omejuje zlasti nekoliko prenizka togost in trdnost, viskoelastični karakter, ter pomanjkanje toplotne in kemične odpornosti.

Omejeno konkurenčnost lesa kot materiala v navedenih področjih lahko v prvi vrsti izboljšamo z raziskavami in razvojem novih izdelkov in rab. Tehnološke izboljšave in inovacije, kot so napredni lesni kompoziti, zaščitni premazi ter kombinacije lesa z drugimi materiali, odpirajo nove rabe. Raziskave in razvoj novih obdelovalnih tehnik, impregnacijskih procesov ter naprednih lesnih in hibridnih kompozitov ponujajo nove priložnosti. Razvoj biološko razgradljivih zaščitnih premazov na primer izboljšuje odpornost lesa na kemijske in mehanske obremenitve.

Na izboljšanje konkurenčnosti lesnih materialov ali izdelkov ključno vplivajo politike, ki spodbujajo trajnost in inovacije, subvencionirajo raziskave in promovirajo obnovljive materiale, tudi s standardizacijo in uvedbo trajnostnih certifikatov. Če hočemo, da bo les ostal vodilni med trajnostnimi materiali prihodnosti, tudi tam, kjer danes še ni konkurenčen, se morajo za to zavzemati industrija, znanost, politika in se povezovati. Poleg tehnoloških rešitev je ključna tudi promocija in izobraževanje ter seznanjanje o prednostih lesa kot trajnostnega materiala.

Vprašanje ostaja: ali lahko znanost, industrija in politike združijo moči, da bi les postal material prihodnosti na vseh področjih? V znanosti in izobraževanju si za doseg tega cilja vsekakor prizadevamo.

Wood has always been a crucial material for humans. Today, in a socially responsible environment where sustainability, renewable resources and environmental awareness are key factors, it is both a commercially competitive material and a key to realizing the circular economy.

Wood has clear advantages in furniture and interior design, but is also very important for the construction industry, where various wood composites play an important role. The mechanical properties of wood and wood composites, such as high strength and favourable relation of weight to density, ease of processing and good or even exceptional insulating properties, mean that they are widely used in the construction of buildings.

Wood of low-grade quality has an important place in the packaging industry, where more and more companies are switching from polymers to packaging made of wood or paper.

However, wood remains less competitive in several areas, where wood composites lag behind metals, polymers and man-made composites. In extreme conditions wood lags behind high-performance materials, as is the case in sports equipment, particularly due to its sensitivity to moisture and UV radiation, as well as the natural variability of wood's properties. Plastics continue to dominate in the packaging industry, mainly due to their lower cost and flexibility in processing and use. However, lighter and more durable wood-based materials could replace plastics in packaging, while hybrid composites could combine the aesthetics of wood with the mechanical advantages of other materials. In the much more demanding automotive and aerospace industries, wood is mainly limited by its

slightly too low stiffness and strength, its viscoelastic character and its lack of heat and chemical resistance compared to metals and high-tech polymers.

The limited competitiveness of wood as a material in these areas can be improved primarily through research and development of new products and applications. Technological improvements and innovations, as well as the development of new processing techniques, impregnation processes, advanced wood composites, protective coatings and combinations of wood with other materials, open up the possibility of new applications. For example, the development of biodegradable protective coatings improves the resistance of wood to chemical and mechanical stresses.

Political measures to promote sustainability and innovation, support for research and the promotion of renewable materials, including standardization and the introduction of sustainability certificates, have a decisive influence on improving the competitiveness of wood-based materials or products. Joint efforts of industry, science and politics are necessary if wood is to remain a leading sustainable material of the future, and further expand into areas where it is not yet competitive. In addition to technological solutions, efforts at promoting and raising awareness of the benefits of wood as a sustainable material are also necessary.

The key question is thus whether science, industry and politics can join forces to make wood the material of the future in all areas, and that's something we are certainly working towards in the fields of science and education.