

Urban retractable roofs

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Abstract:

Due to climate change, cities are increasingly affected by extreme heat waves. Progressive global warming amplifies the effect known as the "urban heat island", with urban areas heating up significantly more than the rural environment. Various research reports have identified convertible membrane roofs as an effective measure for cooling urban spaces. Mobile roofs provide significantly better cooling than stationary roofs: While shading is provided during the day to reduce heating, particularly effective cooling can occur at night when the membrane is folded, as the uncovered components radiate their heat directly against the night sky. According to the laws of thermodynamics, heat exchange via radiation between heated building components and the clear night sky leads to far better cooling than with building components also covered at night. Furthermore, at night uncovered urban spaces and courtyards allow stronger air flows, also dissipating heat. In urban environment, convertible roofs constitute effective measures for both CO₂ avoidance and urban climate impact adaptation.

For geometrical and technical complexity, retractable membrane applications are still very rare today. The author has been dealing with the main architectural and technical issues of such structures for many years. To this end, he optimized details and developed simplified drive systems, which have been implemented in various projects over the past years.

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