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Flood proofing measures cost-efficiency analysis for hydraulic risk mitigation in an urbanized riverine area

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Use of non-structural measures for flood risk mitigation is often more economically accessible, easy to implement and are highly effective, but only if this use is supported by a detailed hydraulic analysis necessary for a correct design. Among the non-structural measures, a progressive and increasingly accentuated importance is attributed to flood proofing interventions, especially in view of the pursuit of risk resilience objectives. Flood proofing interventions are normally classified in two main types: dry flood proofing and wet flood proofing. One measure of dry flood proofing is the shielding, which consists in the use of flood barriers, which can be installed at the entrance of the buildings or at a certain distance from them in order to avoid contact with the houses and deviate the flow of water. A similar type of interventions also avoids inducing sensations of false security (levee effect) in the exposed population and therefore contributes to increasing their resilience. In the context of risk management, resilience is the intrinsic ability of a system to modify its functioning before, during and following a change or an event, so as to be able to continue the necessary operations both under expected conditions and under unexpected conditions. Aim of work presented here is to determine an optimal combination and choice between different types of structural and non-structural measures, through the development of a methodology for assessing the real effectiveness of different measures, through a cost-benefit analysis (CBA) starting from the estimate of direct flood damage. The application of the CBA, to the real case study of the Mela river, located in north-eastern Sicily, which suffered a flooding in October 2015, supported by the determination of the real damages after the flood and the

modelling of the same for the alternative scenario, has returned results significant capable of affirming the ability to reduce or avoid part of the damage.

<https://drive.google.com/file/d/14dIP9Nt0A8bc4UUrv8az8pxlHp8bZ6GV/view?usp=sharing>