Chemical decontamination of façade cracks MERLIN A. ETZOLD, JULIEN R. LANDEL, STUART B. DALZIEL, DAMTP, University of Cambridge — The problem of cleaning and decontamination of buildings arises in the context of chemical spillages, terrorist attacks, industrial applications and in day-to-day situations such as the removal of graffiti. A common feature of all buildings is the existence of cracks and fissures, which act as contaminant traps. This contribution reports experiments and modelling of the removal of a water-soluble contaminant from the bottom of an idealised V-shaped crack. The contaminant is dissolved in a polymer thickened droplet. The surface washing techniques commonly used in industrial decontamination induce a flow in the crack which is mostly controlled by the crack geometry. Rinsing with pure water is compared against the situation in which a neutralising chemical is present. The cleaning process is modelled by solving the time-dependent diffusion equation within the droplet coupled to the steady state advection-diffusion equation outside the droplet. This approach is similar to the work of Landel et al. on decontaminating plane surfaces beneath falling films [JFM (2016), vol. 789, pp. 630-668]. Our results indicate that the proposed model describes successfully the earlier stages of decontamination. In later stages the dissolution of the thickened matrix may contribute to the process.

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