

Supplementary Material: Procedural Bump-based Defect Synthesis for Industrial Inspection

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1 Visual Comparison under Varying Defect Counts

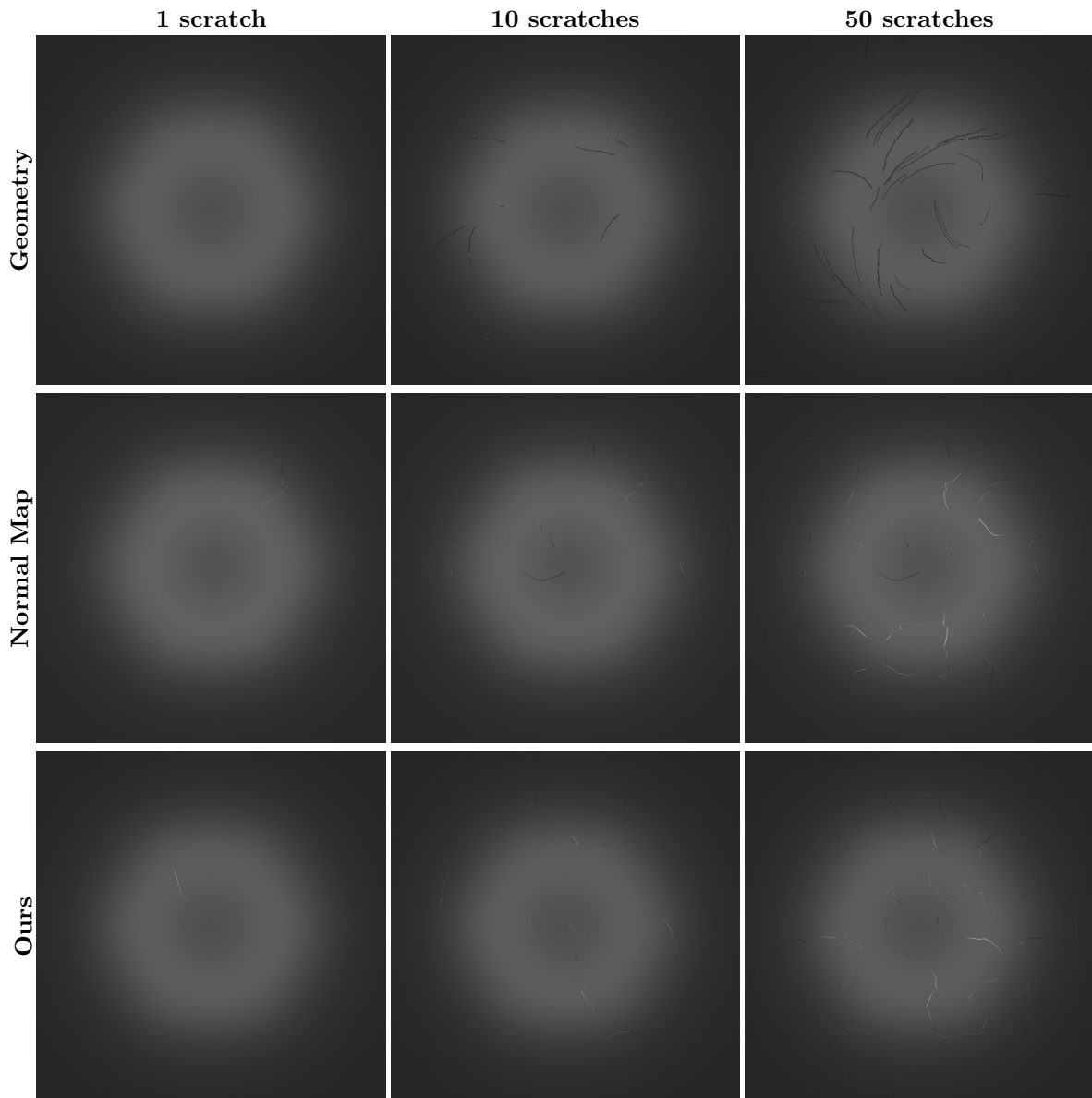


Figure 1: Visual appearance under different numbers of scratches (1, 10, 50).

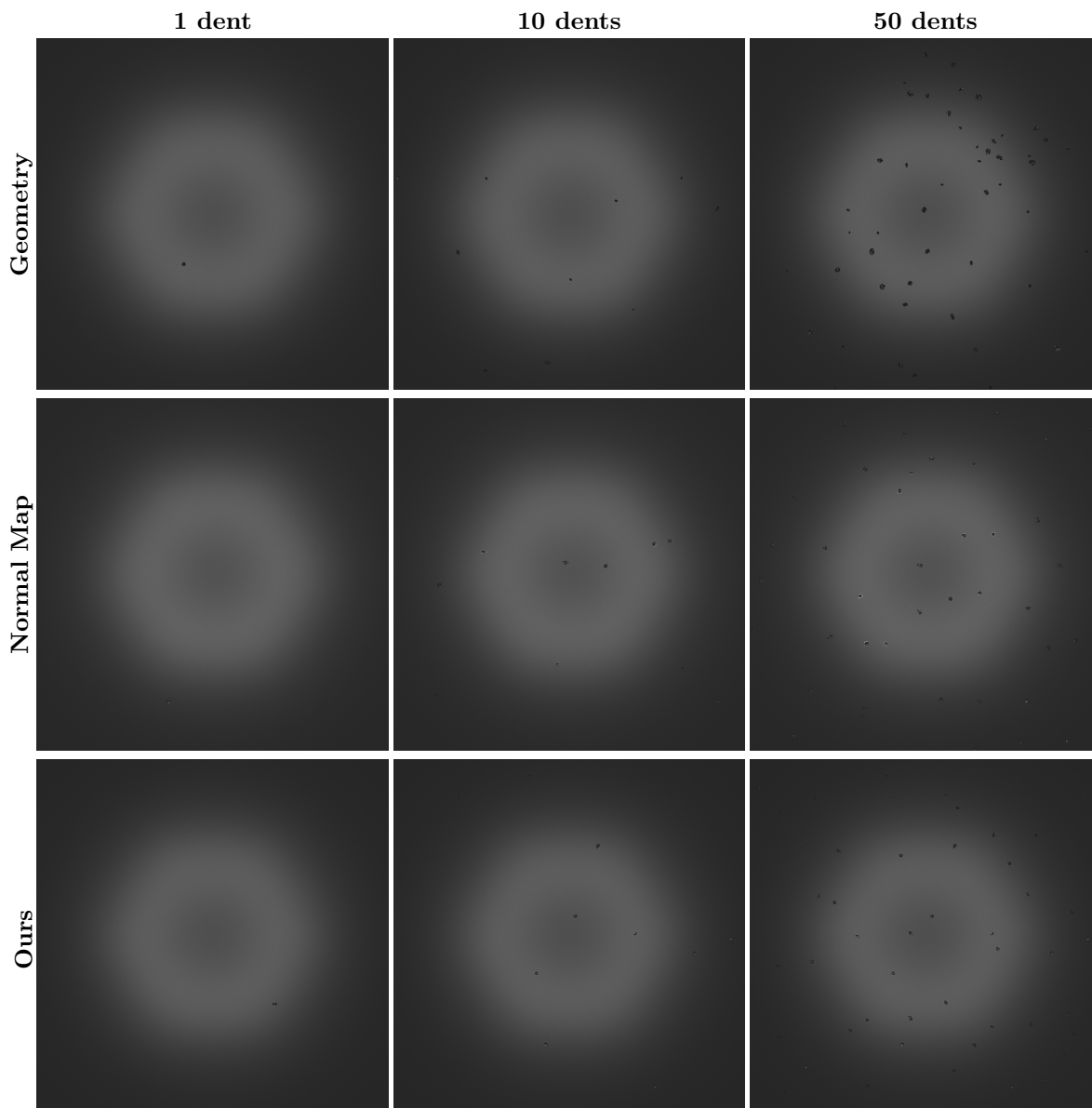


Figure 2: **Visual appearance under different numbers of dents (1, 10, 50).**

To visually supplement the performance evaluation in the main paper, we compare the output of each method under 1, 10, and 50 defects. This helps assess visual quality and stability under varying defect densities. To better focus on scratch generation, we do not include additional metal surface textures such as sandblasting or milling. Instead, a pure metallic BRDF is used as the background material.

2 Modeling Intersecting Scratches via Shader Composition

By default, each scratch in our method is confined to a single grid cell, and its maximum length is set to be smaller than the cell spacing, so overlapping between scratches does not occur. However, if overlapping or intersecting scratches are desired, for example to mimic more realistic wear patterns, this can be achieved by stacking multiple shader layers on the same surface. Figure 3 illustrates this capability using 2, 3, and 4 overlapping scratch layers.

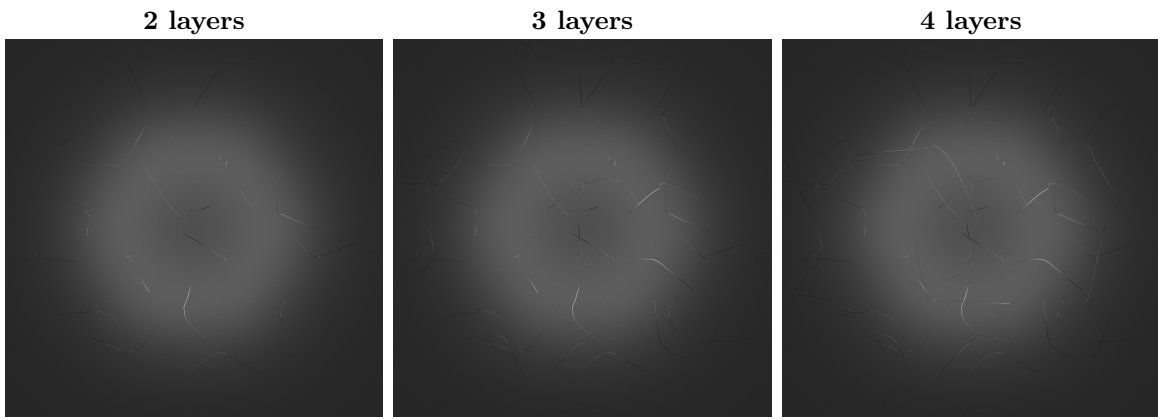


Figure 3: **Explicit modeling of intersecting scratches via shader composition.**