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We will discuss a computational study of two new blow-up criteria for the 3D incompressible Euler equations, based on the 3D Euler-Voigt equations. Traditional computational searches for blow-up have analyzed the enstrophy coming from the 3D Euler equations themselves, which are not known to be globally well-posed, and moreover, are extremely difficult to simulate accurately. In contrast, the new blow-up criteria described here rely only on analyzing the enstrophy of the 3D Euler-Voigt equations, which are known to be globally well-posed and are less computationally intensive to simulate. (Received September 18, 2015)