p-toroids and their 3-triangulations

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It is known that we can always 3-triangulate (i.e. divide into tetrahedra) convex polyhedra but not always non-convex ones. Polyhedra topologically equivalent to sphere with p handles, shortly p-toroids, could not be convex. So, it is interesting to investigate possibilities and properties of their 3-triangulations. Here, we will study the minimal necessary number of tetrahedra for the triangulation of a 3-triangulable p-toroid. For that purpose we will develop the concepts of piecewise convex polyhedra and graph of connection.