Polyhedral approximations of Riemannian manifolds.

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I'm trying to understand which Riemaniann manifolds can be Lipschitz approximated by polyhedral spaces with curvature bounded below or above. The necessary conditions I found consist of some special inequality for curvature tensor at each point. (Surprisingly, it seems that this condition has never been considered before.) This inequality is also sufficient condition for local approximation. It is conjectured that this condition is also sufficient for global approximation, but I only can prove it with some extra topological assumptions.