We study the factorization properties of block monoids $\mathcal{B}(\mathbb{Z}/q\mathbb{Z}, S)$ resulting from the EZADS construction given by Chapman and Smith. This construction, which is inspired by a paper of Erdös and Zaks, takes a finite set of integers (called an EZADS input) and produces a weakly half-factorial block monoid with a simple atomic structure. We are primarily interested in determining which EZADS inputs will produce a half-factorial block monoid.

We first show that if an EZADS input produces a half-factorial block monoid, then so will any of its subsets. We then derive a bound which significantly simplifies the problem of determining whether a block monoid resulting from the EZADS construction is half-factorial. Using this bound we reformulate the problem in terms of continuous quantities, then we apply these ideas to study three-element EZADS inputs. We describe a finite algorithm which, for fixed m, can be used to classify *all* EZADS inputs in the form $\{m, a, b\}$ which produce a half-factorial block monoid.