A modification has been made in the mating halves of a cam-and-groove hose coupling to prevent rapid separation of the halves in the event that the cam levers are released while the fluid in the hose is pressurized. This modification can be duplicated on almost any commercially available cam-and-groove hose-coupling halves and does not interfere with most vendors’ locks that prevent accidental actuation of the cam levers.

The need for this modification arises because commercial off-the-shelf cam-and-groove hose-coupling halves do not incorporate safety features to prevent separation in the pressurized state. Especially when the pressurized fluid is compressible (e.g., steam or compressed air), the separated halves can be propelled with considerable energy, causing personal injury and/or property damage. Therefore, one purpose served by the modification is to provide for venting to release compressive energy in a contained and safe manner while preventing personal injury and/or property damage. Another purpose served by the modification, during the process of connecting the coupling halves, is to ensure that the coupling halves are properly aligned before the cam levers can be locked into position.

For the purpose of describing the modification, the coupling halves are denoted the receiving and mating halves, respectively. The modification includes the formation of two installation/removal slots and two safety pockets in the receiving coupling half. Each safety pocket is located at an angle of 45° from an installation/removal slot and provides both a “catch” to prevent accidental release and a landing for full installation. The mating coupling half has been modified to receive two shoulder bolts made of A286 stainless steel.

In use, if the mating coupling half is not rotated 1/8 turn relative to the receiving coupling half, then the cam levers cannot be rotated into position and locked to provide the required seal between the two coupling halves. The head of each shoulder bolt slides in one of the installation/removal slots and provides a stop if release is initiated accidentally while the fluid in the hose is pressurized. The safety pocket prevents rotation of the mating coupling half relative to the receiving coupling half while the fluid is pressurized, thereby also preventing sudden separation of the coupling halves. At the same time, the modifications allow the coupling halves to disengage slightly to allow venting of the pressurized fluid. Once pressure in the hose is sufficiently low, the coupling halves can be safely disconnected from each other.

This work was done by Paul Schwindt and Alan Littlefield of Kennedy Space Center. Further information is contained in a TSP (see page 1), KSC-12713.