CLAIMS

1. A personal descent system comprising:

a support structure coupling assembly configured and arranged to be coupled to a descent lifeline, the support structure coupling assembly including,

an adaptor connection member configured and arranged to couple different types of lifelines and lanyards to the support structure coupling assembly; and

a control descent device selectively coupled to the support structure coupling assembly, the control descent device configured and arranged to be coupled to a safety harness donned by a user, the control descent device further configured to detach from the support structure coupling assembly during a descent operation while controlling a payout of the descent lifeline.

2. The personal descent system of claim 1, further comprising:

a D-ring coupled to the support structure coupling assembly; and

a biasing member configured and arranged to biasing the D-ring in a desired position in relation to the control descent device.

3. The personal descent system of claim 2, the support structure coupling assembly further including:

a main connection member having an adapter member aperture configured to couple the adaptor connection member to the main connection member, the main connection member further having at least a descent lifeline termination aperture configured to couple an end of the descent lifeline to the support structure coupling assembly.

4. The personal descent system of claim 1, wherein the control descent device further comprises:

a brake assembly engaged with the descent lifeline to control a payout of the descent lifeline;

a housing, the brake assembly received within the housing, the housing having an entry passage for the descent lifeline to enter the housing and brake assembly and an exit passage to exit the housing; and

a break away seal configured and arranged to seal the exit passage.

5. The personal descent system of claim 4, further comprising:

a sealing bolt having a central passage, the sealing bolt received in the entry passage of the housing, the descent lifeline passing through the central passage of the sealing bolt.

6. The personal descent system of claim 1, further comprising:

a latch arm pivotally coupled to the control descent device, the latch arm selectively received within a latch arm mounting aperture in the main connection member to selectively couple the control descent device to the main connection member of the support structure coupling assembly.

7. The personal descent system of claim 6, wherein the main connection member of the support structure coupling assembly engages the latch arm at a location on the latch arm that reduces a load on an activation lock pin that holds the latch arm in a static location in relation to the main connection member to ease activation of the control descent device.

8. The personal descent system of claim 6, further comprising:

a deployment system configured and arranged to selectively lock and unlock the latch arm to the control descent device to the main connection member, a portion of the deployment system positioned to be activated by the user of the safety harness.

9. The personal descent system of claim 6, further comprising:

a buddy deployment system configured and arranged to activate the deployment system by a rescue person.

10. The personal descent system of claim 9, further comprising:

the buddy deployment system configured to break away from the personal descent system after activation of the deployment system.

11. The personal descent system of claim 6, further comprising:

a fuse pin configured and arranged to keep the latch arm in the latch arm mounting aperture in the main connection member during non-fall events.

12. The personal descent system of claim 1, further comprising:

a spool to hold the descent lifeline; and

a sealing container, the spool received within the sealing container.

13. The personal descent system of claim 1, further comprising:

the control descent device including a descent housing, the descent housing having a deployment passage and a conical mouth opening to the deployment passage; and

a deployment system configured and arranged to deploy the control descent device to detach from the support structure coupling assembly during a descent operation, the deployment system including an elongated portion passing through the deployment passage in the descent housing, the deployment system configured and arranged to deploy the control descent device by pulling the elongated portion, the curvature of the conical mouth opening being configured to not impede the pulling of the elongated portion regardless which direction the elongated portion is being pulled.

14. A personal descent system comprising:

a descent lifeline;

a support structure coupling assembly including,

a main connection member including a latch arm mounting aperture, the descent lifeline coupled to the main connection member, and

a D-ring coupled to the main connection member; and

a control descent device including,

a housing, the housing configured and arranged to be coupled to a safety harness donned by a user,

a latch arm pivotally coupled to the housing, the latch arm selectively received within the latch arm mounting aperture of the main connection member to selectively couple the support structure coupling assembly to the control descent device,

a brake assembly received within the housing, the brake assembly engaged with the descent lifeline to control a payout of the descent lifeline, and

a self-deployment system configured and arranged to selectively release the latch arm to allow the latch arm to pivot in relation to the housing therein causing the latch arm to be removed from the latch arm mounting aperture of the main connection member.

15. The personal descent system of claim 14, wherein the support structure coupling assembly further includes:

an adaptor connection member coupled to the main connection member, at least one of the D-ring and the adaptor connection member configured and arranged to couple a support lifeline to the support structure coupling assembly.

16. The personal descent system of claim 14, wherein the self-deployment system further comprises:

a self elongated portion, a portion of the self elongated portion being received within a deployment passage within the housing;

a lock pin coupled to an end of the self elongated portion, the lock pin selectively received with a lock aperture of the latch arm to selectively lock the latch arm in a static position in relation to the housing; and

a biasing member received within the deploy passage of the housing, the biasing member positioned to assert a biasing force on the lock pin into the lock aperture of the latch arm.

17. The personal descent system of claim 16, further comprising:

a stop coupled to the self elongated portion;

a buddy activation base member including a seat, the stop received within the seat, the buddy activation base member further including a ramp surface; and

a buddy elongated portion having a first end and a second end, the first end of the buddy elongated portion coupled to the buddy activation base member, the second end of the buddy elongated portion coupled to a buddy activation portion that is configured and arranged to be engaged by a rescue person.

18. The personal descent system of claim 17, further comprising:

a containment system to house the control descent device, the containment system having a slot, the containment system including a side passage in which a portion of the buddy activation portion extends through, the containment system further having a pocket to hold another portion of the buddy activation portion proximate the side passage.

19. A personal descent system comprising:

a descent lifeline;

a support structure coupling assembly including,

a main connection member including a latch arm mounting aperture, the descent lifeline coupled to the main connection member, and

an adaptor connection member coupled to the main connection member, the adaptor connection member configured and arranged to couple a support lifeline to the support structure coupling assembly;

a control descent device including,

a housing, a pair of spaced descent connecting arms extending from the housing, the pair of spaced descent connection arms having aligned routing apertures,

a latch arm pivotally coupled between the descent connection arms, the latch arm selectively received with the latch arm mounting aperture of the main connection member to selectively couple the support structure coupling assembly to the control descent device, and

a brake system contained within the housing, the brake assembly engaged with the descent lifeline to at least in part control a payout of the descent lifeline; and

a spool to hold at least a portion of the descent lifeline, the descent lifeline routed from the spool into an entry to the housing, through the brake system in the housing, out an

exit in the housing, through the aligned routing apertures in the descent connection arms to the main connector member.

20. The personal descent system of claim 19, further comprising:

a self-deployment system configured and arranged to selectively allow the latch arm to pivot in relation to the housing to detach the control descent device from the support structure coupling assembly; and

a buddy deployment system configured and arranged to selectively allow the latch arm to pivot in relation to the housing to detach the control descent device from the support structure coupling assembly by a rescue person.

21. The personal descent system of claim 19, further comprising:

the housing having a deployment passage and a conical mouth opening to the deployment passage; and

a self-deployment system configured and arranged to selectively allow the latch arm to pivot in relation to the housing to detach the control descent device from the support structure coupling assembly, the self-deployment system including a self elongated portion that passes through the deployment passage in the housing, a radius of a curvature of the conical mouth opening being configured to not impede a pulling of the self elongated portion regardless of a direction the self elongated portion is pulled.

22. The personal descent system of claim 19, further comprising:

a break away seal positioned near an exit of the housing; and

a fuse positioned to prevent the latch arm from rotating in relation to the housing until a select amount of force is applied.

23. A personal descent system comprising:

a descent lifeline;

a support structure coupling assembly configured and arranged to be coupled to a descent lifeline;

a control descent device selectively coupled to the support structure coupling assembly, the control decent device including,

a housing, the housing configured and arranged to be coupled to a safety harness donned by a user, the housing having an entry passage for the descent lifeline to enter the housing and an exit passage to exit the housing;

a break away seal positioned near the exit to the housing;

a brake assembly received within the housing, the brake assembly engaged with the descent lifeline to control a payout of the descent lifeline, and

a self-deployment system configured and arranged to selectively disconnect the control descent device from the support structure coupling assembly;

a spool configured and arranged to hold at least a portion of the decent line, the descent lifeline passing from the spool into the entry passage to the housing; and

a sealing container positioned around the spool to prevent moisture and debris from reaching the descent lifeline on the spool.

24. The personal descent system of claim 23, further comprising:

a sealing bolt having a central passage, the sealing bolt received in the entry passage of the housing, the descent lifeline passing through the central passage of the sealing bolt.

25. The personal descent system of claim 23, further comprising:

the housing having a first housing portion and a second housing portion, the housing further having a deployment passage to receive the self-deployment system;

a housing seal positioned between the first housing portion and the second housing portion;

as first seal positioned proximate a first end of the deployment passage; and

a second seal positioned proximate the second end of the deployment passage.

CLAIMS

1. A personal descent system comprising:

a support structure coupling assembly configured and arranged to be coupled to a descent lifeline, the support structure coupling assembly including,

an adaptor connection member configured and arranged to couple different types of lifelines and lanyards to the support structure coupling assembly; and

a control descent device selectively coupled to the support structure coupling assembly, the control descent device configured and arranged to be coupled to a safety harness donned by a user, the control descent device further configured to detach from the support structure coupling assembly during a descent operation while controlling a payout of the descent lifeline.

2. A personal descent system comprising:

a descent lifeline;

a support structure coupling assembly including,

a main connection member including a latch arm mounting aperture, the descent lifeline coupled to the main connection member, and

a D-ring coupled to the main connection member; and

a control descent device including,

a housing, the housing configured and arranged to be coupled to a safety harness donned by a user,

a latch arm pivotally coupled to the housing, the latch arm selectively received within the latch arm mounting aperture of the main connection member to selectively couple the support structure coupling assembly to the control descent device,

a brake assembly received within the housing, the brake assembly engaged with the descent lifeline to control a payout of the descent lifeline, and

a self-deployment system configured and arranged to selectively release the latch arm to allow the latch arm to pivot in relation to the housing therein causing the latch arm to be removed from the latch arm mounting aperture of the main connection member.

3. A personal descent system comprising:

a descent lifeline;

a support structure coupling assembly including,

a main connection member including a latch arm mounting aperture, the descent lifeline coupled to the main connection member, and

an adaptor connection member coupled to the main connection member, the adaptor connection member configured and arranged to couple a support lifeline to the support structure coupling assembly;

a control descent device including,

a housing, a pair of spaced descent connecting arms extending from the housing, the pair of spaced descent connection arms having aligned routing apertures,

a latch arm pivotally coupled between the descent connection arms, the latch arm selectively received with the latch arm mounting aperture of the main connection member to selectively couple the support structure coupling assembly to the control descent device, and

a brake system contained within the housing, the brake assembly engaged with the descent lifeline to at least in part control a payout of the descent lifeline; and

a spool to hold at least a portion of the descent lifeline, the descent lifeline routed from the spool into an entry to the housing, through the brake system in the housing, out an exit in the housing, through the aligned routing apertures in the descent connection arms to the main connector member.

4. A personal descent system comprising:

a descent lifeline;

a support structure coupling assembly configured and arranged to be coupled to a descent lifeline;

a control descent device selectively coupled to the support structure coupling assembly, the control decent device including,

a housing, the housing configured and arranged to be coupled to a safety harness donned by a user, the housing having an entry passage for the descent lifeline to enter the housing and an exit passage to exit the housing;

a break away seal positioned near the exit to the housing;

a brake assembly received within the housing, the brake assembly engaged with the descent lifeline to control a payout of the descent lifeline, and

a self-deployment system configured and arranged to selectively disconnect the control descent device from the support structure coupling assembly;

a spool configured and arranged to hold at least a portion of the decent line, the descent lifeline passing from the spool into the entry passage to the housing; and

a sealing container positioned around the spool to prevent moisture and debris from reaching the descent lifeline on the spool.