

## Häst Rescue Frames – Bipod

The bipod is perhaps the most versatile of the three frame configurations. It can be stood vertically like a tripod for a simple vertical lift, or it can be tilted to one side or another to move a rescued animal up to 24 feet horizontally. It is this configuration that has received our utmost attention because of this versatility and because the forces that are encountered due to the tilting of the frame. These horizontal forces should be understood completely prior to using the frame. While the frame is designed to withstand a considerable amount of load weight, failure of the system, should it occur, will most likely arise from either inadequate rigging or failing to properly secure the feet to the ground surface.

When assessing a rescue scene where the bipod will be utilized, the initial decision will consist of ascertaining the location of the frame. This decision is made with two factors in mind: The first is the desired horizontal direction of travel from the patients current location towards that of a safe recovery area. The second decision is the distance (up to 12 feet) from the rescued animal to an imaginary base line that runs between the two bipod feet. (Note: The bipod can be used on unlevelled ground by adjusting the length of the legs thus making each leg a different length. The distance between the holes in the lower columns is 1 foot. In addition, the distance between the feet can be adjusted to accommodate the terrain and available space, however, because the frames have a fixed angle, lessening the distance will also lower the overall height of the bipod head.) Once the basic frame location is determined, construction of the frame can commence.

If foot location is critical, the process may begin with placing the feet in the positions that are available. However, assembly of the bipod in this order may not be as rapid. If there are no restrictions on foot placement, perhaps the fastest means is to first place the bipod head on the ground in a direction away from the animal to be rescued on the opposite side of the base line which runs between the bipod feet. Then, a column set can be inserted into the bipod head and secured with a pin. (Tip: To facilitate alignment of the column set with the bipod head, it may be helpful to place a small wooden block under the bipod to raise that portion above the ground.) Then, insert another column set into the bipod head and secure with a pin. (Note: Whether the bipod feet are previously attached to the bottom of the columns, or if they are assembled after the columns are placed in the bipod head are simply a matter of preference by the rescue agency. If the feet, due to location restrictions, have to be placed on the ground before assembly, it would be better to insert the column sets into the bipod head before attachment of the feet.)

Once the column sets are in the bipod head, the legs may be extended to their desired length and the feet attached if not done so previously. If the bipod is not in the final desired location, it is easy to lift utilizing at least three persons to be placed in its final position.

At this time it is necessary to secure the feet to the ground. If the surface on which the feet are resting is soil, one can secure the feet using ground stakes. (Note: On soil conditions, the rubber pads should be removed and the cleats on the bottom of the aluminum foot plate should be allowed to engage the soil.) While four stakes per aluminum foot plate is recommended, as many as are needed may be used if the soil is particularly soft or sandy. In addition, if soil conditions are poor, a chain kit may be needed that runs between the bipod feet to mitigate the spreading forces encountered by the frame under load. If the surface on which the bipod feet are to rest is either concrete or asphalt, ground stakes obviously cannot be utilized. In this case, the supplied rubber pads should be attached to prevent damage to the surface and to elevate the base plate so that carabiners, ropes, or chains can be attached. For this configuration, to keep the feet from sliding in any direction, the feet must be secured to remote anchors. In addition, the use of the chain kit is mandatory to mitigate the spreading forces on the legs.

Once the feet are secured into position, the rigging may be attached to the bipod head. Special note: All of the rigging to the bipod head MUST be attached to the red ring, and the red ring ONLY. This includes the rigging lines that will tilt or position the top of the frame as well as the hoist system for the animal. The red ring is large enough that it should be more than adequate in size to accommodate any and all attachment requirements. It is the use of this ring, which constitutes a floating, self aligning, anchor point that is the key in keeping all forces in the center of the columns for maximum strength of the system.

Notes on rigging: Obviously, the hoisting system will require a mechanical advantage pulley system. Often a 5:1 ratio system is used between the red ring and the animal to be rescued, but this can be changed to better match the situation. When using a rope pulley system, the "haul line" should be brought down one of the legs to a "change of direction pulley" attached to one of the feet in the middle hole. Configuring the haul line in this fashion has two positive results. One, it lessens the tension on the top rigging lines when the animal is tilted in the same direction as the haul team. Second, it keeps the haul line close to the ground so that in the event a secondary 3:1 haul system is being used on the rescue side of the pulley and a "reset" is needed, it is close to the ground for easy access. The position rigging lines, because of the high amount of load encountered, (these loads can be almost TWICE the weight of the animal being rescued) typically a 9:1 pulley system is used.

After the system has all the haul and rigging lines attached to the red ring, the frame is hoisted by hand. Once it is high enough, help from rescue personnel on the rigging lines can assist in final vertical placement of the frame. Once all the lines are adjusted, and the rescue is ready to commence, the frame is tilted over the animal. Note: The frame should NEVER be tilted more than 45 degrees off of vertical! If this is done, the loads on the rigging system can increase significantly along with ground shear forces on the feet and the system can fail. While the frame will remain intact, it is the rigging system and dislodging of the ground stakes that will cause the failure.

Once the haul system is positioned over the animal, the sling can be attached and the animal raised. Once the animal is above ground level, the bipod is then tilted the other way to allow the animal to be then lowered into the recovery area. The same tilting requirements on the frame, that of being less than 45 degrees off of vertical, remain for the recovery. Now that the animal has been recovered and removed from the area, the frame can then be lowered to the ground, disassembled, and packed away. There is no particular order needed for deconstruction.