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Article

Luggage Lingo: How to Select the Right Bag for International Healthcare Missions

If you have been looking for a durable piece of luggage for international travel and words like ballistic nylon, aircraft aluminum, interlocking inside handle and ergonomic shoulder strap causes your head to spin, you are not alone!

A bag is needed for hauling equipment on international trips

GO Peds, the Loma Linda organization dedicated to sending Pediatric Residents on international rotations, recently started to search for a capacious duffle bag for team medications and equipment. The requirements were pretty straightforward. The bag had to be large enough to hold all of the clothing, team medications, teaching equipment and vacation flotsam for a team leader. It had to be light and skinny enough to fit into the trunk of a small car and meet international airline requirements. It also had to be durable, strong enough to be able to stand-up to the abuse of luggage handlers who, in the hinterlands of this planet, workout their aggressions on defenseless suitcases. Oh, and did I mention that it had to be reasonably priced? After all, we are stewards of God's limited financial resources!

Just when I was pretty sure that I understood the luggage phenotype for which we were looking, my colleagues added a list of luggage niceties that they thought would be essential: an external handle, to maximize the space in the bag, wheels for speeding the bag through congested airports, room for two medication boxes, a plethora of handles to grab and carry the bag (presumably to get away from the occasional charging water buffalo), a snap connection so that additional baggage (like a computer) can be attached.

First, allow me to say that I am not an expert on luggage. But, like most physicians, I try to “do my homework” by reading, searching the internet and talking to people. I have learned a bit about luggage and want to share my observations.

Luggage Materials

Most suitcases are made out of a nylon material, known in the industry as ballistic nylon, which was originally developed by DuPont for the U.S. Department of Defense for use in flak jackets.

Typical denier and dimensions for evaluated luggage

Luggage	Denier	Weight/Dimensions/Capacity
TravelPro TPro Extreme 30in Rolling Duffel 	1680	Weight 9.1 lbs Dimensions 30.00"h x 14.00"w x 13.00"d 57 Linear inches Capacity 5187 cubic inches Capacity/Weight 570 cubic inches/pound
Briggs and Riley Baseline 30 inch upright duffel 	2520	Weight 16 lbs Dimensions 30.00"h x 16.50"w x 16.00"d 62.5 Linear inches Capacity 7524 cubic inches Capacity/Weight 470 cubic inches/pound
Pathfinder Revolution LT 32in. Rolling Duffel 	2520	Weight 8.11 lbs Dimensions 16.00"h x 32.00"w x 16.00"d 64 Linear inches Capacity 7783 cubic inches Capacity/Weight 960 cubic inches/pound
Victorinox Swiss Army Werks Traveler 31in. Duffel 	1680	Weight 15 lbs Dimensions 15.00"h x 31.00"w x 14.00"d 60 Linear inches Capacity 6185 cubic inches Capacity/Weight 412 cubic inches/pound
Tumi Generation 4 luggage 	Fusion Z ballistic nylon	Weight 20.57 lbs Dimensions 16.00"h x 35.00"w x 13.00"d 64 Linear inches Capacity 6916 cubic inches Capacity/Weight 336 cubic inches/pound

Cordura® is an air-textured, high-tenacity nylon made by DuPont. Ballistic nylon/Cordura® is preferred by many outdoor equipment and luggage manufacturers. Many of these fabrics are coated with Teflon to decrease amount dirt penetration into the fabric. The basket-weave construction of ballistic nylon adds abrasion resistance. In tests conducted pitting ballistic nylon against nylon and leather, ballistic scored the highest. Leather scuffed at 25 cycles, nylon failed at 295 cycles, while ballistic nylon was only affected after 3000 cycles. In tests conducted to measure tear resistance, nylon started tearing at 5 pounds, Cordura tore at 74 pounds, and ballistic nylon held strong at 250 pounds. Ballistic nylon and Cordura® are rated by denier, which refers to the weight of a single fiber used to make the fabric.

While 160-denier is the lightest, most luggage manufacturers use 630 to 2520 denier fabrics in the construction of their luggage. The higher the denier number the heavier the fabric. In addition to the weight of the fibers, strength and abrasion resistance are achieved using differing techniques of stretching, spinning, or weaving the fabric. The strength of the fabric is assessed through tenacity which is the strength per denier, and the breaking strength, which is the tenacity x denier. Investigators have determined that Tru-Ballistic 1050 denier fabric is the strongest and most durable fabric for its denier weight level. For the shopping public, most luggage manufactures provide the denier numbers only, not tenacity or breaking strength.

The material used provides significant strength to the bag. However, cellular baffles incorporated into the material on the exterior of the luggage provides greater support and rigidity. Plastic or fiberglass frames along with molded corner pieces provide rigidity. Stair glides and rigid plastic rails that run the length of the bag cover areas that would be subject to repeated scuffing. Carbon fiber or plastic stays provide more rigidity to the bag. Some of the best bags allow one to remove some of the stays if a softer, less rigid bag is needed. The stays provide an additional amount of bag support which translates into better protection for the equipment inside the bags. All of the components, like handles and wheels should use sturdy fasteners, including lock-nut fasteners.

Luggage Design

The design of the bag impacts its usefulness and longevity. For GO Peds, a rolling duffle style bag seemed to be the best design for loading and unloading equipment and medications. The duffle bag-type design is not divided or compartmentalized, thus allowing the greatest amount of flexibility in packing. Most duffle bags are larger than most regular type suitcases which seem to be designed with a lower height:depth ratio. Duffle bags with separate external compartments are of great use for organizing equipment.

Better bags tend to have fully lined interiors with taped seams. Straps and handles should be sewn directly to the bag material, not tucked into a seam, and

then sewn. An interior waterproof compartment for toiletries is a nice feature to have. Some bags have an expandable section which gives one additional packing room, while others have a mesh pocket on the inside or outside to keep packed items secure and organized during transit. The Briggs and Riley and Travel Pro duffle bags have lower sub-floor compartments that easily accommodate medication boxes. The Pathfinder Revolution duffle has two separate compartments on both ends of the bag, which we deemed to be somewhat less useful.

Zippers

After the material used to construct the body of the luggage, zippers tend to be a next most common site for potential luggage failure. Don't you have a sad old suitcase or a backpack in the bottom of your guest room closet with a busted zipper? YKK zippers are widely regarded as the best, most durable zippers on the market. Most of the zippers used in luggage construction are constructed of nylon. Pretty amazing stuff that nylon! Look at the bag to determine if large heavy-duty self-repairing nylon coil zippers are used. These zippers are not as likely to split, jam or fail. Some manufacturers have increased the abrasion resistance of the zipper coil stitching by 30% in recent years. A "U" shaped zipper to the main compartment is considered to be better than a single "down the middle" type of zipper. Some "U" shaped zippers start and end at the base of the bag, making it even easier to load the bag due to better access to the main compartment.

Handles and wheels

Some bags have a collapsible handle made of aluminum and wheels which improve the mobility of the bag. A sturdy aluminum handle, which is lighter than steel, can either be on the exterior of the bag, which leave an uncluttered interior, or on the inside of the bag, which makes the bag appear more uniform and . Given the need for maximal amount of interior bag space, a bag with an exterior handle was deemed slightly better. Some luggage manufacturers have used in-line skate wheels for the bottom of the bag, for optimal smooth rolling. Look for replaceable wheels, which are a definite advantage. Make sure that the wheels are on the corners of the bag, not mounted towards the center. I have a small carry-on bag with wheels that are not corner mounted. While rushing through terminals, the bag often starts to wobble and then flips over. I often feel as if I am trying to wrestle with an unwilling child to follow me!

For larger duffle bags, additional handles including bottom grab handles and shoulder straps can be of great value for moving the bag quickly into the back of vans or even into small boats (in piranha-infested waters). The addition of an adjustable cargo strap with speed clip buckles makes it easier to attach other pieces of equipment, making the two or more bags a single unit.

Extra features

Some luggage comes with a rubberized TSA-approved lock. These locks comply with current international security guidelines because they can be opened by inspectors. While these locks can be purchased separately, some luggage manufacturers will include a lock as part of the purchase.

The weight of the bag was an important consideration since airlines have imposed per-passenger luggage weight limits. The bags evaluated ranged from 8.11 to 20.57 pounds. While there is a relationship between durability and weight, lighter weight bags with more capacity could allow one to pack more weight into a bag. Another way of looking at weight would be capacity divided by weight. The Pathfinder Revolution had the highest at capacity/pound (960), while the Tumi Generation 4 had the lowest (366).

Value

Cost for a given functionality can be difficult to determine. The price range on the luggage ranged from \$89 (a closeout TravelPro bag) to \$645 (Tumi Generation 4). A better warranty and ease of obtaining a repair can influence which piece of luggage is chosen. We briefly gave consideration to purchasing less expensive bags, with a plan to replace them more frequently. However, durability and better protection for the equipment were seen as more important factors to the GO Peds team. Some bags just seemed to be too flimsy to withstand the rigors of frequent international travel.

What did we choose?

We eventually chose the Briggs and Riley Baseline duffel, which sold for around \$350. Thus far the duffel has been on two trips (Honduras and Cambodia) and has performed flawlessly. According to Bill Kennedy, who took the bag to Cambodia, "It is an absolutely perfect bag. I was able to fit all of my equipment and clothing into the bag. It performed flawlessly".

I chose two Pathfinder Revolution bags for our personal use. After one trip to China, the Pathfinder Revolution bags are still in excellent shape.

We will be giving our readers an update on the bag performance next February (2007). By then, we suspect that it will have traveled to at least 6-10 international destinations. Will the bag be bashed in Botswana? Crushed in China? Left by the side of the road in Lebanon?

Stay tuned for an outcome analysis (with photos) on the Briggs and Riley and Pathfinder Revolution luggage in one year!