

Do It Yourself for People With Disabilities

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DIY for PWD: Disability & Invention



- Apply principles of:
- DIY
- Open Source
- Disability Rights
- Universal Design
 - Typewriter, 1843
 - Jacuzzi – arthritis
 - Oxo tools
 - Good for everyone!

DIY for PWD: Intro



GimpGirl.org Party in Second Life. 2008.

- Take apart issues around disability tech
- Market & demographics
- Easy hacks
- intermediate hacks
- Political history
- Big international projects. Complex.

DIY for PWD: Simple ideas



- The Tennis Ball Walker
- Common
- Simple
- Cheap
- Effective
- Noticeable
- Still necessary!

DIY for PWD: Complicated!



- International issues
- Language barriers
- Medical, orthopedic
- Laws, regulations
- Manufacturing
- Market: Import/Export
- Local Industry
- Training, repair
- Human rights

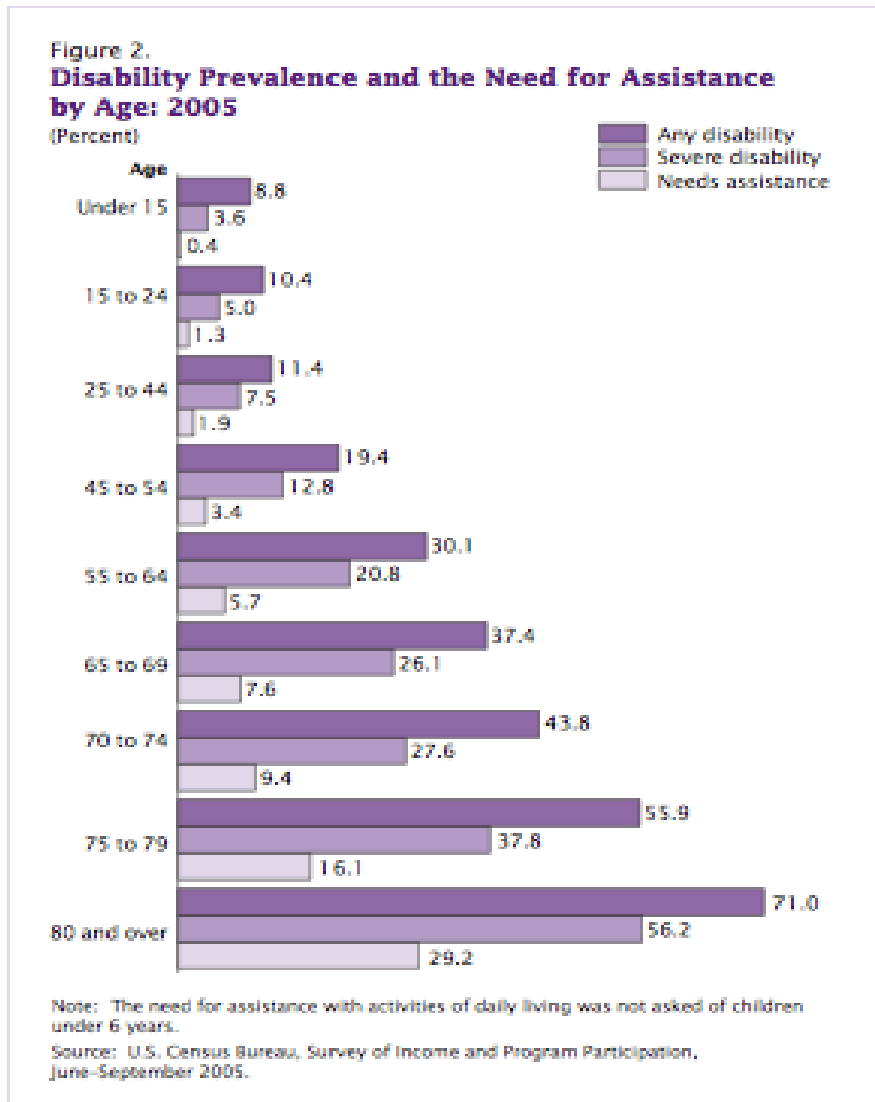
DIY for PWD:

Why we need open info, online



- People adapt by giving up activities
- Where to get info, equipment?
- Medical authority
- Charity model
- Consumer model
- Inventions and DIY

DIY for PWD: Demographics



- 11M-55M pwd in U.S.
- 4%-18% of population
- 55M “some” disability
- 35M severe disability
- 11M need help with daily living activities
- Plus institutionalized
- This % is growing fast
- You will likely be a PWD for at least 8 years.
 - Yes, you. And don't say that you'll kill yourself first.

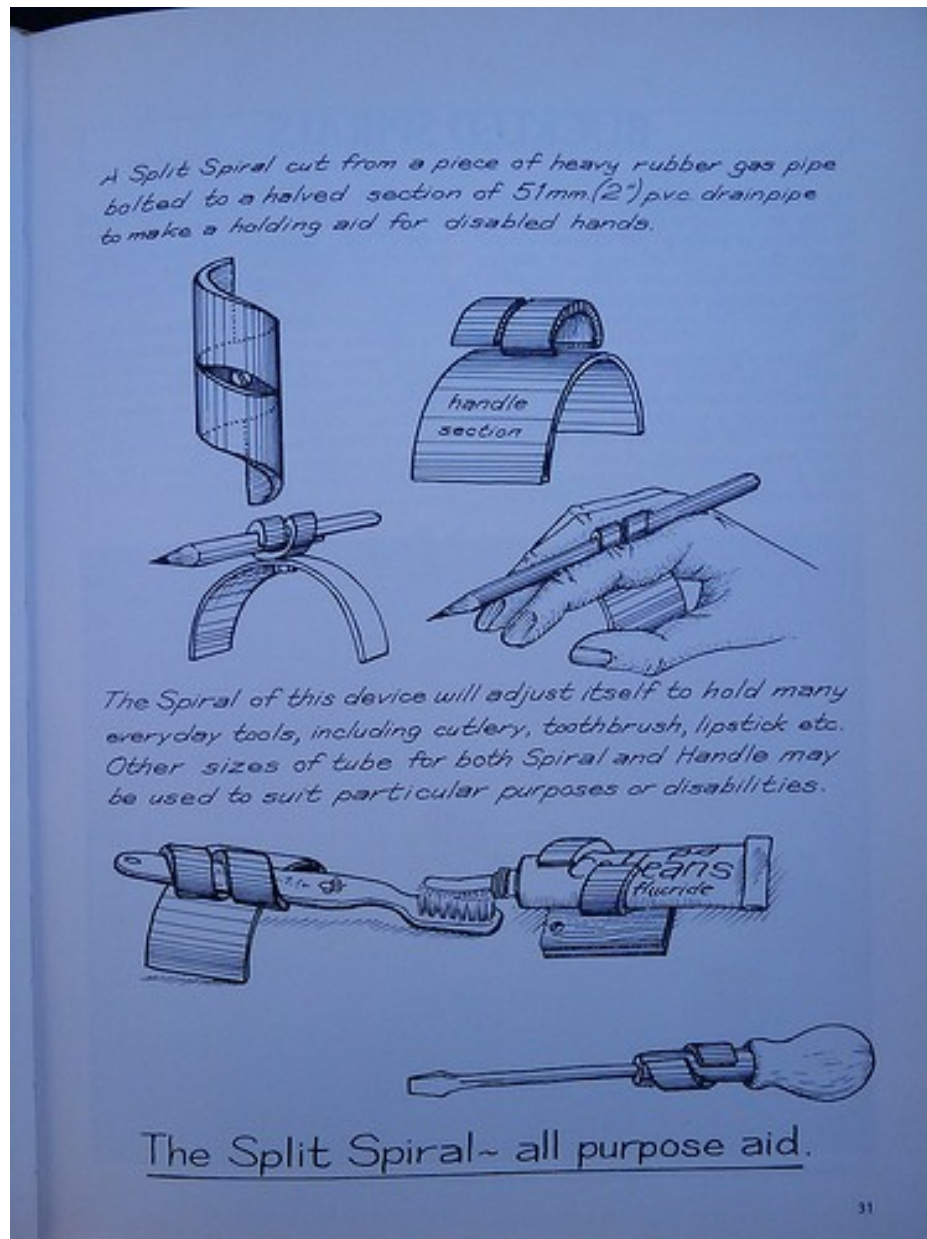
DIY for PWD: Market for Wheels



HokeySpokes.com. Good for wheelchairs!

- 2.7 M use wheelchair
- 9.1 M walker/crutch
- 20.9 M ride bikes
- Bikes: \$5B
- Wheelchairs: >\$3.2B
- Growing. 5B in 2011.
- Huge market!
- Competition fierce.
- Big global companies.

DIY for PWD: Easy hacks



- Holding things
 - Helps grip, dexterity
 - Rubber bands
 - Binder clips
 - Corks
 - Bike handle tape
 - Rubber dip
 - Split tubing

Handmade Helps for Disabled Living,
Stuart E. Grainger, 1981.
A fantastic book.

DIY for PWD – Easy hacks



- Carrying things
 - Cross-strap backpack
 - Open tote bags
 - Crutch pockets
 - Travel mugs, bottles
 - Duct Tape!
 - S-hooks for groceries
 - Baby carrier on walker

DIY for PWD: Easy hacks



- Information!
 - Labelling tape (Dymo)
 - Control language for voice activation
 - Example: Use another human language for a meta-language to control devices.
 - Address label on cane (Simple, brilliant)

Easy Hacks: Sports!

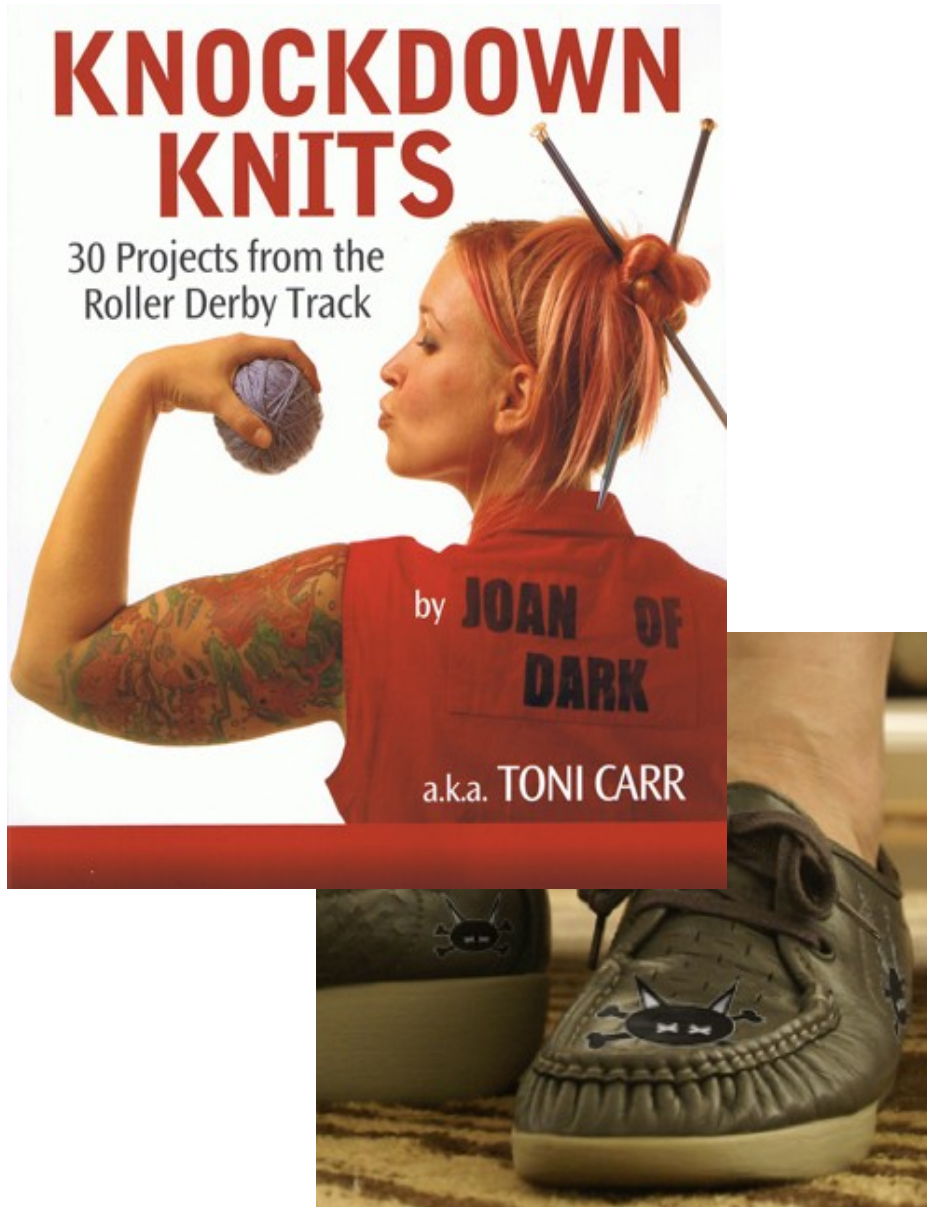


- Haddyr's bike and crutch hack
- \$13 at hardware store
- Gasket, hose clamps, pipe



Don't assume what people are and aren't capable of doing. Abilities vary widely, sometimes in the same person from day to day.

DIY for PWD: Easy Hacks



- Make it cool
- Fashion, pride, identity
- Blinky lights
- Flames and flowers
- Stickers, stencils
- Customizability

DIY for PWD: Easy hacks



- Problems:
- Make it once, patent, sell, keep info private or very limited
- Tips, how-tos, simple craft, don't need special tools
- For solo DIY or with helper
- Diagnosis-specific newsletters, patient groups, and sites
- Individual doctors, physical or occupational therapists
- Wikis: Wikihow, Instructables, Disapedia
- Blogs, Forums: Wheelchair Junkie

DIY for PWD: Intermediate Hacks



- DIY home mods.
- Infrastructure change
- Strength, special tools
- Example: offset door hinges



DIY for PWD



- Miguel Valenzuela – Lift Assist inventor
- Toilet lift
- Hydraulic only
- Can force people into institutions
- \$100 from pvc pipe
- On personal (abandoned) blog
- What to do with idea?

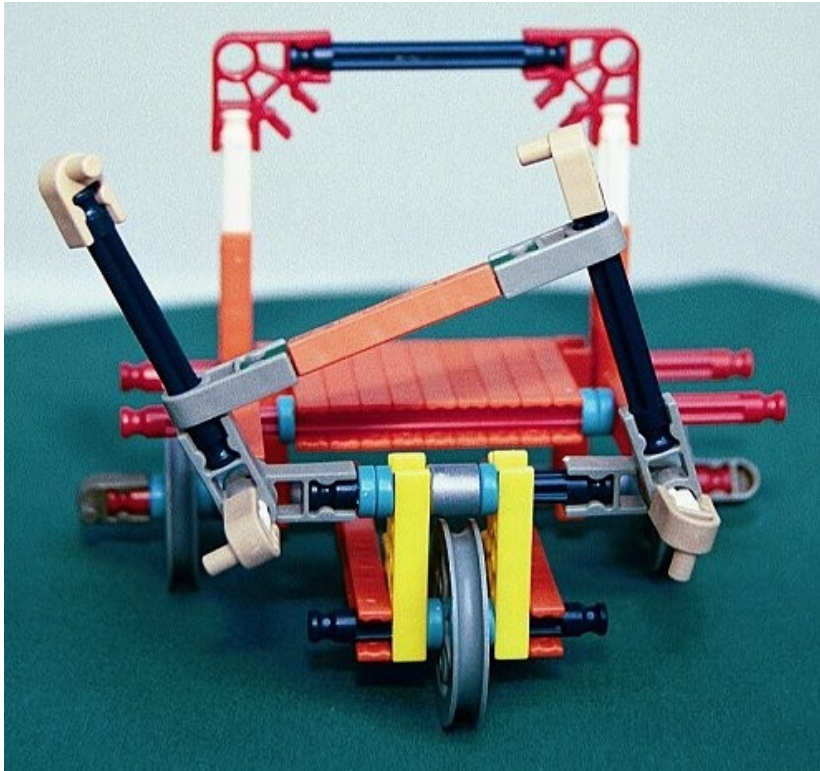
DIY for PWD: Intermediate Hacks



- Mobility!
- Speedy Kitten is speedy
- K'nex
- Part time use
- Geocities, ~1998

- A mobility device like a wheelchair, crutches, or walker may, or may not, require special medical knowledge. It depends!

DIY for PWD: Intermediate Hacks



- Speedy Kitten's cart
- Legal Disclaimers
 - Example: “ K'NEX® Industries, Inc. does NOT supply schematics or any information related to applications of the use of their toys for these purposes. The designs and ideas are from Dr. Jeszenka, owner of Speedy. “
- Medical warnings
- Trained orthopedic vets only!

DIY for PWD: Intermediate Hacks

Legal fears hurt information spread.

People are afraid to share information freely on this subject, where they aren't afraid to share other similar kinds of information.

21. [AID FOR INSERTING PAPER INTO TYPEWRITER.](#)
----- "DO IT YOURSELF" ENTRY ----- PURPOSE: Aid to insert paper into typewriter for the end of a mouthstick or for use with a quad cuff typing stick. A piece of lo
22. [ALGEBRA TEACHING AID](#)
-----"DO IT YOURSELF ENTRY ----- PURPOSE: To assist individuals who are blind in representation of the FOIL method of multiplying (First terms in each set of parent
23. [ALPHABET PUZZLE](#)
---DO IT YOURSELF ENTRY --- PURPOSE: To assist children with cognitive, learning shape recognition and fine motor development. Simple four- to ten-piece cardboard
24. [ALPHABOXES](#)
--- DO IT YOURSELF --- PURPOSE: To teach braille letter recognition to pre-reader represent a braille cell (a muffin tin or a plastic box divided into three rows of two
25. [ALTERING JACKET.](#)
----- "DO IT YOURSELF" ENTRY ----- PURPOSE: Altering a jacket to remove extra wheelchair. The back of the jacket is shortened so that the finished hem is level wi

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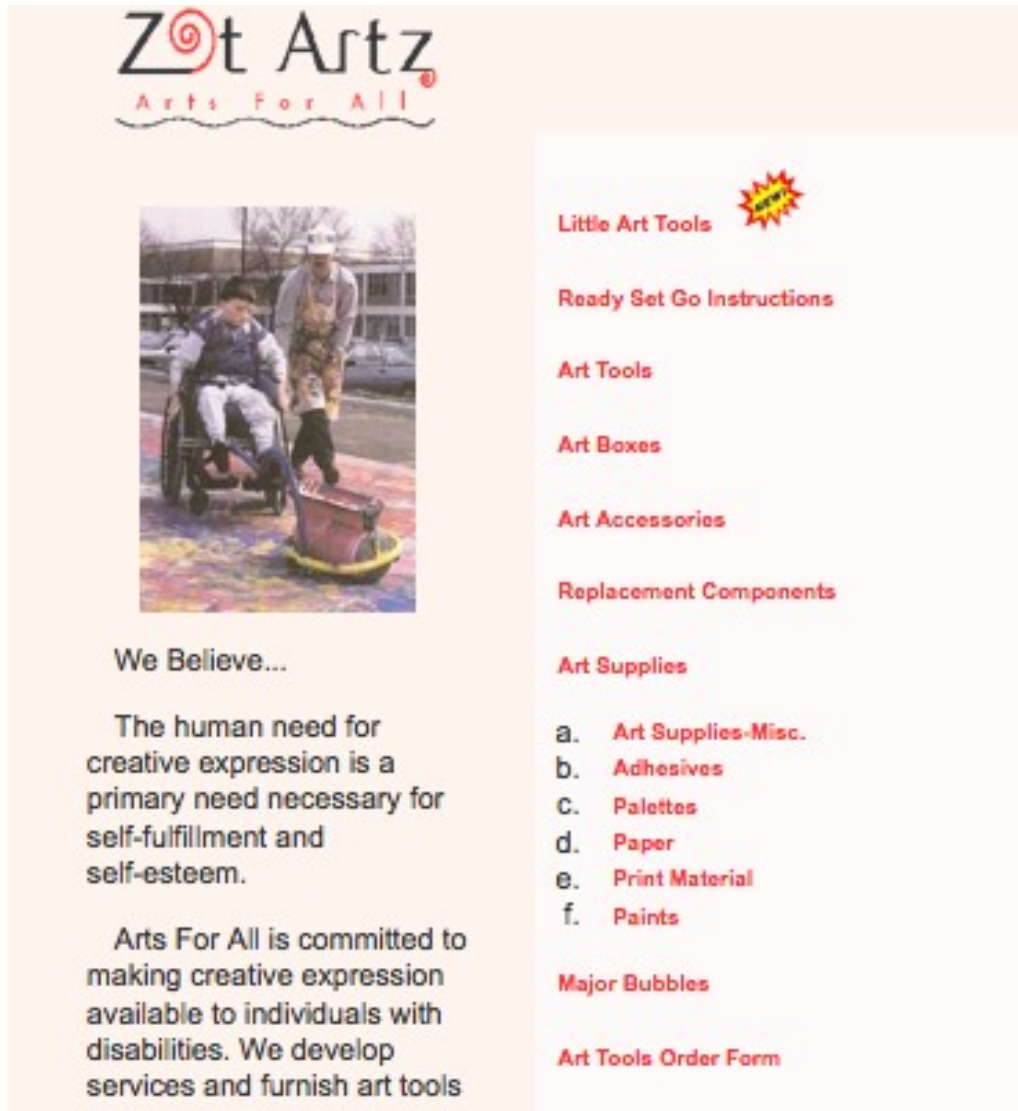
Here's the ABLEDATA Disclaimer, on a long annotated link list.

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Source: <http://www.abledata.com/abledata.cfm?pageid=19327&top=12933&trail=22,12691,12927>
Nice URL, dudes.

DIY for PWD: Intermediate Hacks

- Arts for All painting
 - golf caddy carts
 - rotisserie motors
 - lawn mower frames
 - attach to walkers, chairs
 - Great inventions!!
 - Patents + not very good online store = limited and local implementation

The image is a screenshot of the Arts For All website. At the top left is the logo "Zot Artz" with "Arts For All" underneath. Below the logo is a photograph of a person in a wheelchair painting a colorful path on a sidewalk, with another person standing nearby. To the right of the photo is a vertical list of menu items: "Little Art Tools" (with a starburst icon), "Ready Set Go Instructions", "Art Tools", "Art Boxes", "Art Accessories", "Replacement Components", "Art Supplies", "Major Bubbles", and "Art Tools Order Form". Under "Art Supplies" is a sub-list: a. Art Supplies-Misc., b. Adhesives, c. Palettes, d. Paper, e. Print Material, and f. Paints.

Zot Artz
Arts For All

We Believe...

The human need for creative expression is a primary need necessary for self-fulfillment and self-esteem.

Arts For All is committed to making creative expression available to individuals with disabilities. We develop services and furnish art tools

Little Art Tools 

Ready Set Go Instructions

Art Tools

Art Boxes

Art Accessories

Replacement Components

Art Supplies

a. Art Supplies-Misc.
b. Adhesives
c. Palettes
d. Paper
e. Print Material
f. Paints

Major Bubbles

Art Tools Order Form

DIY for PWD: Intermediate Hacks

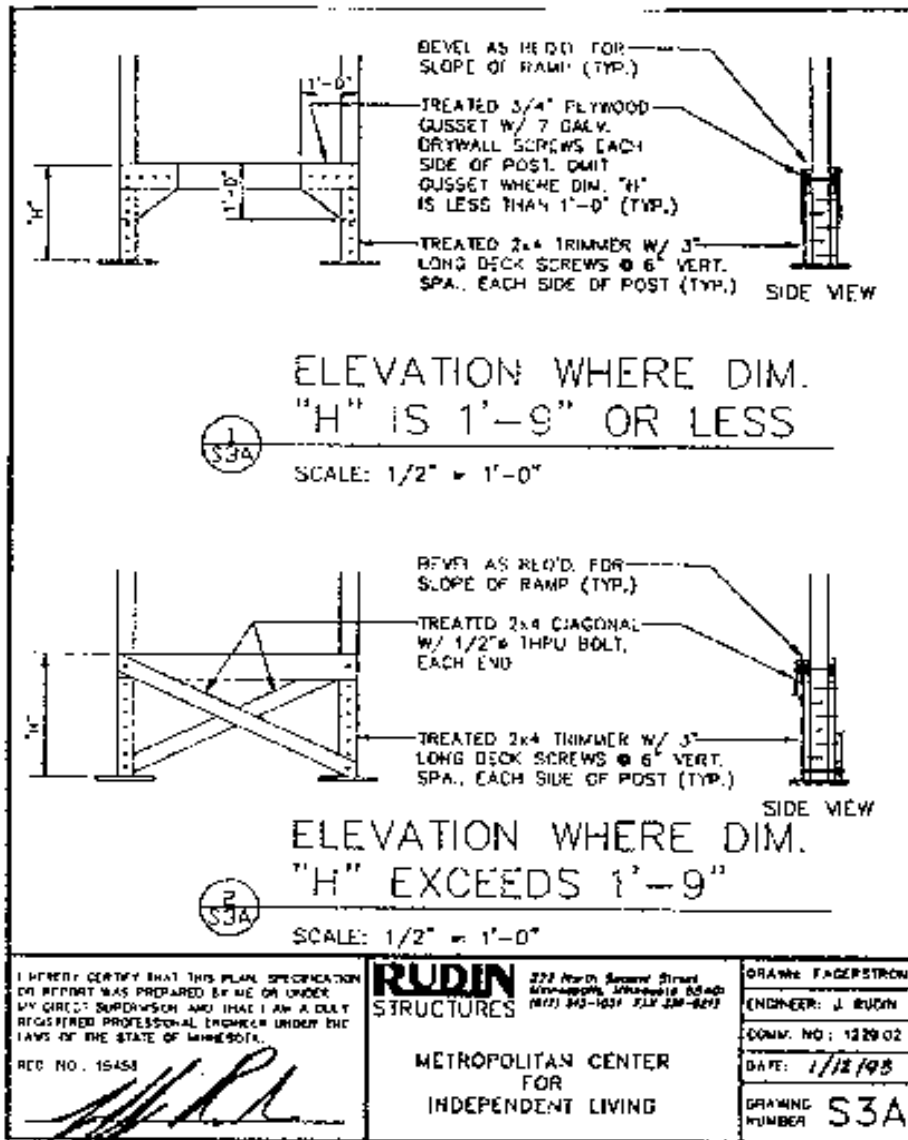


- How medical is your device?
- Bikes. Strollers. Office Chairs.
- Lawsuits. Problems with the ADA. Can be protective and useful.
- Mystification, fear, obfuscation, control
- Disability rights

DIY for PWD: Intermediate Hacks

Example: Ramps

- Nonprofits, state/county governments.
- Detailed blueprints
- Regulations, contractors
- Materials, cost
- Volunteers
- Online! Rare!



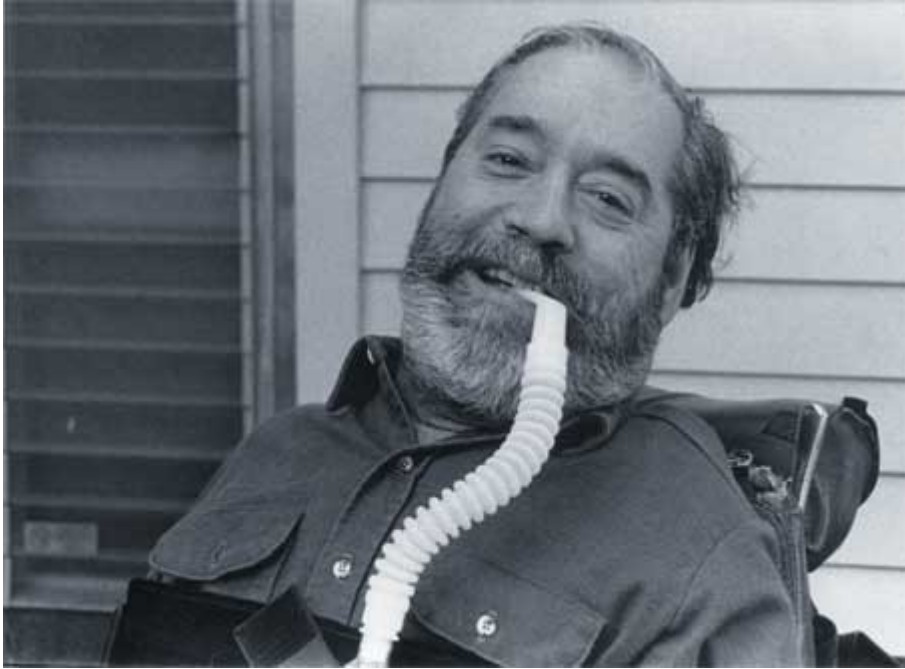
Metropolitan Center for Independent Living, Minnesota Division of Rehabilitation Services, Multiple Sclerosis Society and United Handicapped Federation. Ford Foundation award, 1991.



DIY for PWD: Intermediate hacks

- Require particular technical skill, strength
- Require extra labor. Mobilize volunteers.
- Home modifications
- Sewing, knitting, advanced textile skill
- Metalworking, electronics, engineering
- Classes, workshops, co-ops, TechShop, community colleges
- Need more than a How-To
- Need community!

DIY for PWD: Political History



- Let's look at problems:
- In 60s, 70s, no integration, no curb cuts, infrastructure
- Forced institutional living
- Medicare “Homebound Rules”: house arrest
- Forced sterilization
- Ashley treatment (2007)
- Assisted suicide

- Ed Roberts
- Independent Living Movement

DIY for PWD: Political history



The Black Panther Party and LGBT activists brought food and medicine to the hundreds of disabled people who occupied the Federal Building for 45 days until Section 504 was signed into law.

- 1973 Rehabilitation Act. Section 504.
- Occupation of SF Federal Building
- ADA, ADAA
- CA Fair Employment and Housing Act

DIY for PWD: Political History



- Blogs, activism are on the rise
- Many good local organizations
- Political change still needed

- 2000s: Ed Roberts Campus in Berkeley

DIY for PWD: Political History



DISABILITIES

"We must build a world free of unnecessary barriers, stereotypes, and discrimination.... policies must be developed, attitudes must be shaped, and buildings and organizations must be designed to ensure that everyone has a chance to get the education they need and live independently as full citizens in their communities."

-- Barack Obama, April 11, 2008



"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

- Tim Berners-Lee

DIY for PWD: Global Hacks

- REMAP: A big nonprofit that does a lot of good
- PWD, meet Inventor.
- A single person is helped.
- But . . .
- Information black hole. Why?
- Charity model.
- Lack of online savvy.
- Lack of a way to patent less defensively

DIY for PWD: Global hacks



- Free Wheelchair Mission
- \$52 Wheelchair
- Made in China
- Ship to Uganda
- Problems
 - Undermine local industry
 - Product not sturdy
 - Training, fixing is short term only.

DIY for PWD: Global hacks



- Whirlwind Wheelchair International
- Multiple NGO, multi country involvement
- Plans with local agencies and industry
- Empowerment for PWD. Ongoing.
- Deep followup in community.

DIY for PWD: Global Hacks



The screenshot shows the Instructables website interface. At the top is the 'instructables' logo with a hand icon, and navigation links for Home, Explore, Answers, and Community. Below this is a banner for the '3ALLET SAN FRANCISCO BALLET' featuring a dancer. A secondary navigation bar lists categories: All, Art, Craft, Food, Games, Green, Home, Kids, Life, Music, Offbeat, and Outdoors. The main content area is titled 'Plastic Soda Bottle Prosthesis'. It includes a 'VIEW ALL STEPS ON ONE PAGE' button, a sequence of step thumbnails (intro, step 1-6, PDF), and a 'FEATURED' badge. The 'intro' section contains text about the project's purpose and funding. A list of materials is provided on the left. On the right, there are buttons for EMBED, EMAIL, PRINT, FAVORITE, and FLAG. The bottom half of the image is a large photo of the finished prosthesis, which is a white, bottle-like device with a brush handle attached, being used to lift a white bucket labeled '4 Kg'.

intro Plastic Soda Bottle Prosthesis

We would like to thank everyone for their kind comments, ratings, and votes. A video demonstration of this process has been produced and uploaded to [YouTube](#). In addition, the Technical Note previously submitted to the Prosthetics and Orthotics International Journal has been accepted for publication in the near future. If you would like to know more please feel free to contact us.

In resource-limited areas worldwide, individuals with amputations may not be able to gain access to prosthetics devices due to a lack of the materials needed to fabricate them. This simple technique utilizes a 2-liter soda bottle to create below-the-elbow prosthesis suitable for a number of light-duty activities.

Please note well that this technique is intended for use by trained prosthetists and it is intended to be performed only using a plaster cast of the residual limb.

This work was funded by the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education under grant number H133E030017.

Materials:

- 2-liter plas
- heat gun
- formed pla
- hose clam
- earthen of

4 Kg

- CIR: Center for International Rehabilitation
- Instructables how-to has the basics!
- Prosthetic Arm from a Soda Bottle and PVC pipe
- More info, training, videos, online and RL

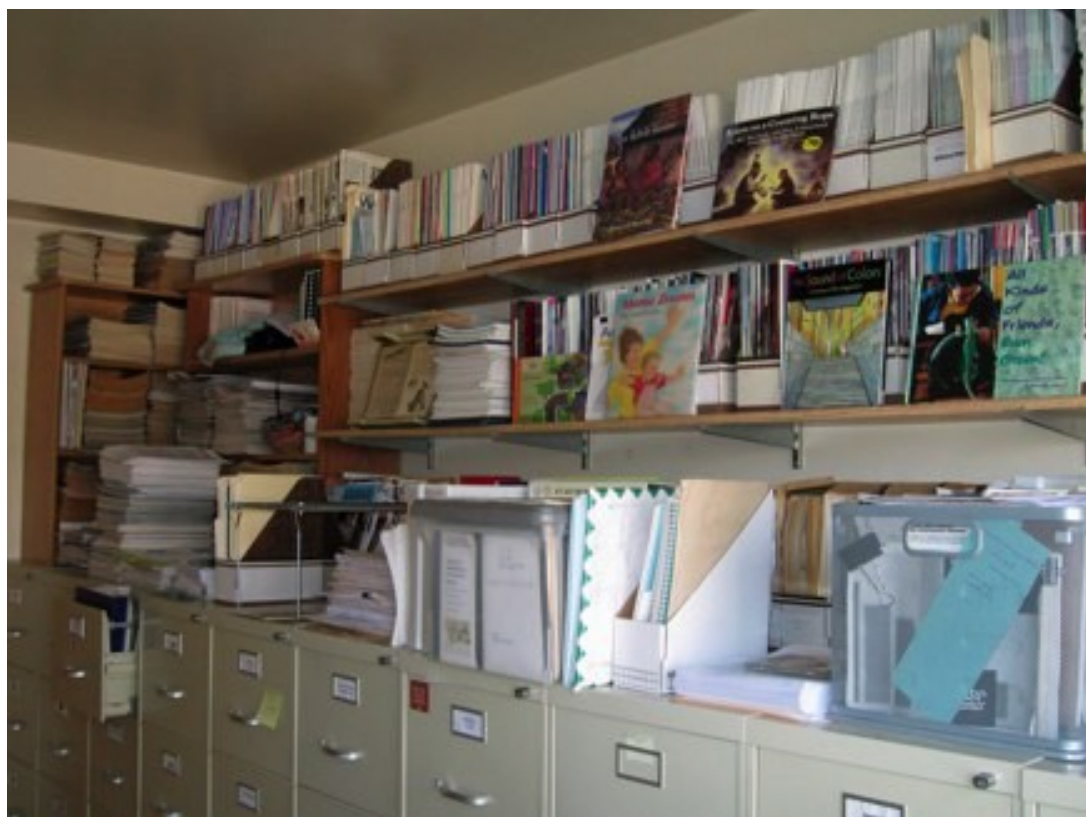
DIY for PWD: Global Hacks



Legal concerns.
Don't try this at home!
Except when you do!
Just put it out there,
have some guts.

- The technique was developed by the Center for International Rehabilitation (CIR) in Chicago. The CIR is a non-profit organization that works in underserved and conflict-affected regions worldwide to meet the needs of people with disabilities.
- - This work was funded by the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education under grant number H133E030017.
- - The plastic soda bottle prosthesis is designed for light-duty activities and should be fabricated by individuals with proper training in prosthetics and related biomechanics.
- Also, Wheelchair distribution/repair/training
- Prosthetic soda bottle leg for baby elephant

DIY for PWD: Where's the information?



Also, in people's heads; ask them. Everyone with disabilities that I've met has invented something. We have to!

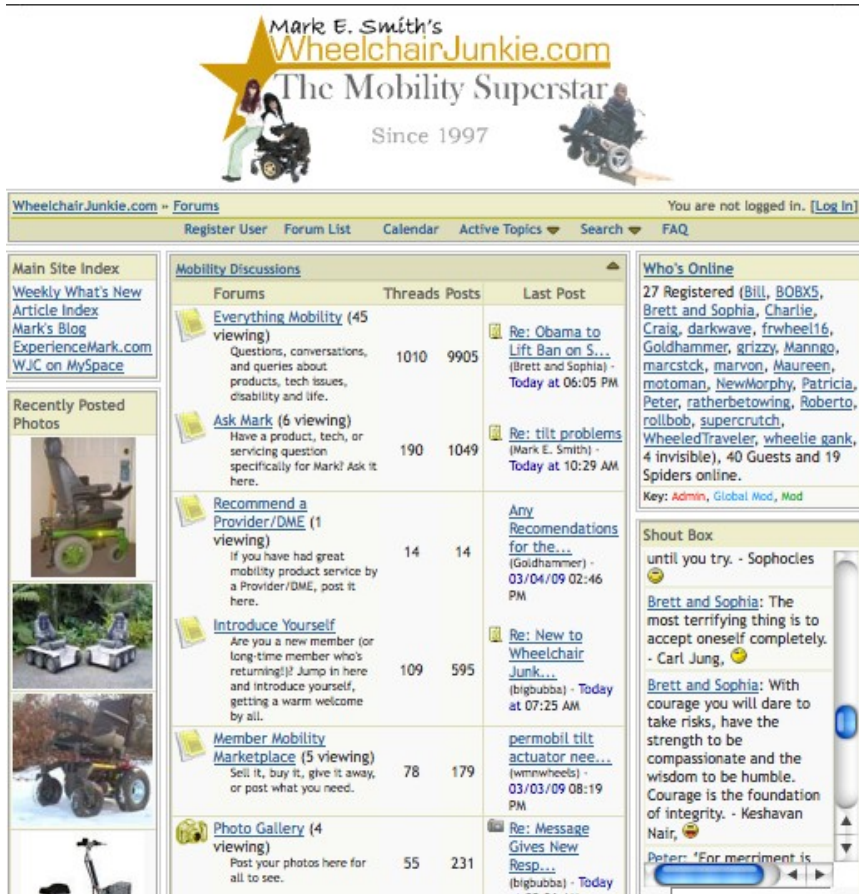
- Organization archives
- File cabinets
- Alexandra Enders, proposal for digitization project
- Private info is lost
- Need it in public domain

DIY for PWD: Hacks Need Communities



- Sometimes you need to see it to think of it
- PWD are often isolated physically.
- Need community for serendipity, invention
- The more complex the idea, the deeper community ties you need.

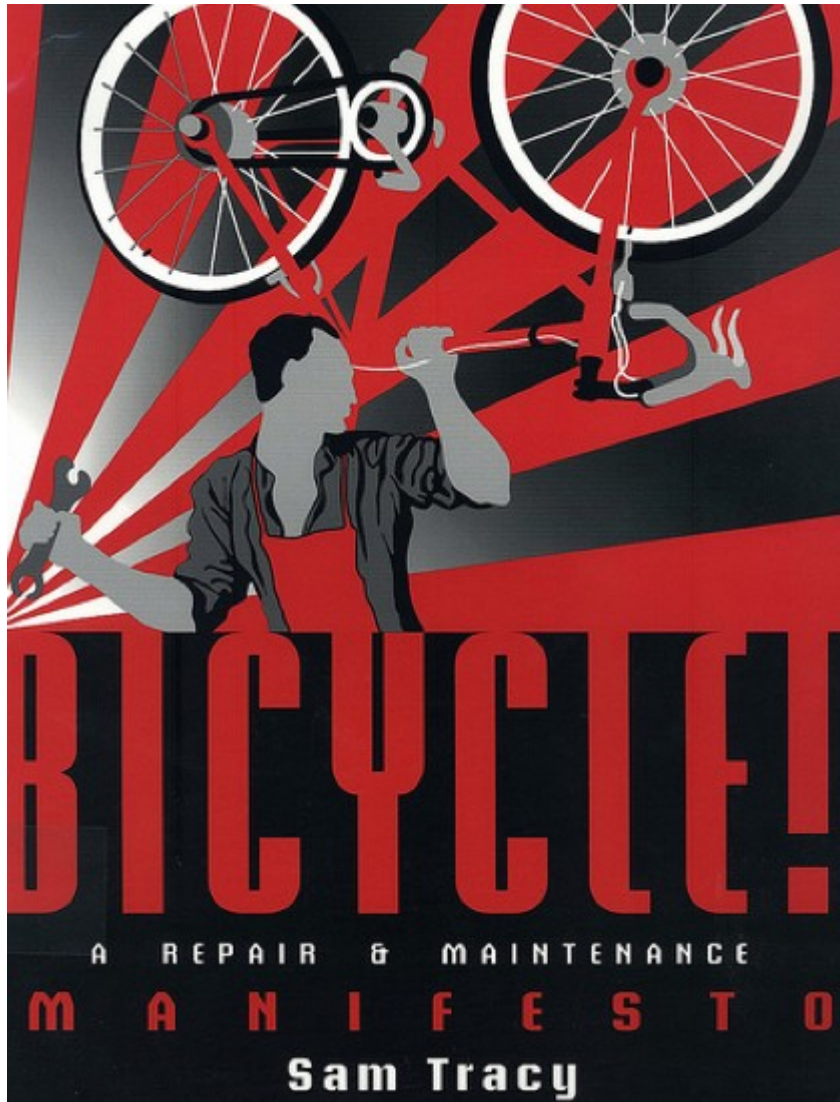
DIY for PWD: Online communities



- Disapedia, Wheelchair Junkie (one person)
- GimpGirl group
- OneSwitch.org
- Mailing lists (Silos!)
- Blog carnivals, OuchUK
 - Disability Studies blog
- Disaboom
 - Corporate, inauthentic

WARNING: While every effort has been made to ensure that all information on this site is accurate, it is for informative purposes and shouldn't be used as an alternative to professional care and instruction. The photos and information on this site may not reflect individual products, and you should consult your mobility professional and product owner's manual to determine your product's capability. Appropriate professional advice should be considered before using any techniques or equipment discussed on this site.

DIY for PWD: Opportunity!



- What's stopping people?
- Cultural differences
- Fear of mortality, pain
- Licensing. Profit
- Forums that aren't controlled by government, academic, or corporate institutions
- Fear of liability
- Are we not hackers?

DIY for PWD: Opportunity!



Trekkinetic all terrain wheelchair, 2008

- Space owned by large clumsy bureaucratic institutions.
- Growing market. Lazy incumbents.
- Biz opportunities for tech, hardware, web?
- Disruptive companies will kick butt

DIY for PWD: Opportunity!



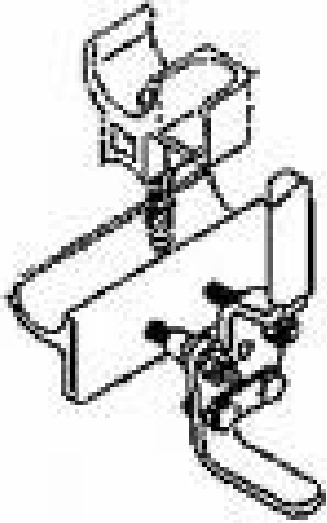
- Team up with accessibility consultants, disabled people, you will learn about practical hacking
- Pay them
- Keep it real!
- Make it cool!

DIY for PWD: The Future



- Tactile Maps
- Mashup, maps for visually impaired
- Lighthouse for the Blind, SF
- \$15 for businesses
- Free for CA residents with visual impairment

DIY for PWD: The Future



- Why do wheelchair brakes suck?
- 3D Printing + open source HW + Copyleft
- Run a contest, open source all entries
- 3D Printers will be increasingly common
- Print new brakes at the hardware store
- This will be awesome!

DIY for PWD: Credits

Partial List of References and Photo Credits.

<http://www.geocities.com/speedykitten/cart.html> Speedy Kitten K'nex cart. Dr. Edwin Jeszenska. 2001.

<http://themonthly.com/feature-03-09.html> Ed Roberts Center, The Monthly. March 2009

<http://www.independent.co.uk/life-style/gadgets-and-tech/features/trekinetic-reinventing-the-wheelchair-858190.html?action=Popup&ino=1> The Independent; Photo by Carlos Jasso

<http://maic.jmu.edu/journal/12.1/feature/socheat/socheat.htm> Journal of Mine Action, AAR Japan Cutting Wheelchair Pipe

http://www.bikeleague.org/media/facts/#how_many
National Survey of Pedestrian and Bicyclist Attitudes and Behaviors was sponsored by the US Department of Transportation's National Highway Traffic Safety Administration (NHTSA)

<http://www.freewheelchairmission.org/thewheelchair.html> Free Wheelchair Mission.

<http://www.dredf.org/504site/photo.html> Section 504 Protests, 1977.

Abledata DIY. <http://www.abledata.com/abledata.cfm?pageid=113582&orgid=109086>

U.S. Census Bureau, Americans With Disabilities: 2005