

Comparing Engineering disciplines and practices

Engineering Disciplines	Key Concepts	Examples	Web links and Resource Sites
Aerospace and aviation	Design, construction and operation of aircraft, propulsion systems, efficiency, spend and strength	Boomerang, woomera,	http://www.aoe.vt.edu/seminars/entries/seminar20141020.html Guinness Book of Records - The oldest boomerang discovered is about 23,000 years old. It was made from a mammoth tusk and ... http://www.alpha-port.com/nesdesigncontest/pdfs/GreatBoomerangChallengeOverview.pdf http://en.wikipedia.org/wiki/Boomerang http://en.wikipedia.org/wiki/Woomera_%28spear-thrower%29 http://www.roninfilms.com.au/feature/10738/western-desert-woomera-fashioned-with-stone.html
Agricultural	Managing the process of growing, harvesting and storing foods	Major Mitchell's journal. Rod Mason - southern highlands, NSW Bruce Pascoe Dark Emu: Black seeds, agriculture or accident? Bill Gammage (2011) The Biggest Estate on Earth: How Aborigines made Australia	http://en.wikipedia.org/wiki/Bush_bread http://en.wikipedia.org/wiki/Portulaca_oleracea http://en.wikipedia.org/wiki/Acacia_tetragonophylla http://www.abc.net.au/radionational/programs/bushtelegraph/rethinking-indigenous-australias-agricultural-past/5452454 http://austhrutime.com/agriculture.htm http://hsc.csu.edu.au/agriculture/production/aboriginal_land/aborigl.html - this site has a lot of good information – only needs to add ‘engineering’ as a term to be of great use ☺ Heather Built – archaeologist Native (wild rice) in Northern Australia (NT) see bush telegraph

Biomedical	Identifying, managing and manufacturing materials and concepts for promoting good health	TBA	http://en.wikipedia.org/wiki/Acacia_tetragonophylla http://www.abc.net.au/radionational/programs/bushtelegraph/rethinking-indigenous-australias-agricultural-past/5452454
Building services	Constructing safe, weatherproof accommodation for living and working	TBA	http://www.australia.gov.au/about-australia/australian-story/austn-indigenous-architecture http://www.creativespirits.info/aboriginalculture/land/aboriginal-houses#toc1 http://www.aboriginalculture.com.au/housing.shtml
Chemical engineering	Design manage technology to convert raw materials into useful products	Aboriginal Environments Research Center University of Queensland	http://en.wikipedia.org/wiki/Spinifex_resin http://ecology.uq.edu.au/content/spinifex-project
Civil	Physical infrastructures urban/living environments	Song lines - Crossing the continent, transporting mining products	Developing pathways that allowed free, and managed, movement of tribes and nations within and across 'country'
Electrical,	Electrical energy – generation and usage		This one may be an 'exception to prove the rule' – however there are clear indicators that Aboriginal peoples knew of the forces exhibited in electrical storms and lightning, although they may not have chosen to seek out ways to use it.
Environmental	Assessing impact of technology, minimising adverse effects, knowledge of legislation/law	See articles on aboriginal law and philosophy to explain how this was enacted	Biocybernetic and thermodynamic perspectives of landscape functions and land use patterns - Zev Naveh. This is a useful beginning point for assessing how different approaches to land management lead to different eventual outcomes. There is much known about, and much yet to be listed, on ways that Aboriginal philosophy/practices shaped the 'take only what you need' approach to low impact engineering

Information, telecommunication s, electronics, network engineering	While Aboriginal nations are often said to be ‘illiterate’ meaning no written language, this is only true insofar as there was not an ‘alphabet’.	A parallel with the ‘songlines’ as a ‘network’	There were at least three clearly evident means of ‘written’ communication used by Aboriginal people – these are Message sticks Petroglyphs – stone carving Smoke signals – use of smoke to convey information across vast distances, crossing language groupings and yet retaining their meaning. It is possible that there were other forms of written language which are as yet un-deciphered (see NSW Library collection of stone ‘cornutes’ - http://trove.nla.gov.au/work/17833016?selectedversion=NBD4100215)
Management	TBA	TBA	Much yet to be listed on the way that Aboriginal philosophy/practice shaped the ‘take only what you need’ approach to low impact engineering
Mechanical	Thermodynamics, Dynamics, fluid dynamics Force and energy to set solid members in motion, stop or change trajectory	TBA	This discipline us still being explored. More information will be added as the project develops.
Mining (work with geologists)	Investigate / extract ore bodies and mineral deposits	NSW records list more than 300 known Aboriginal mining sites in that State. At least 12 ores/minerals were extracted, including ochre, blue metal, granite, greywacke, etc.	http://www.environment.gov.au/node/19708 Wilgie Mia, Weld Range in WA. The largest known Aboriginal mine in Australia. At least 40,000 kilograms of ocher were mined over a period of +/- 8,000 years.

Naval architecture	Boat building and propulsion	Canoes – see Maritime museum article	Dugout canoes - http://en.wikipedia.org/wiki/Aboriginal_Dugout_Canoes Bark canoes - http://australianmuseum.net.au/Building-a-canoe-noe-nowey/ http://www.australiangeographic.com.au/news/2010/08/aboriginal-traditional-canoe-recreated/
Water and waste management - Aquaculture	Physical, chemical, and biological treatment of water/wastes	TBA	http://www.environment.gov.au/heritage/places/national/brewarrina http://en.wikipedia.org/wiki/Brewarrina,_New_South_Wales http://www.environment.nsw.gov.au/heritageapp/visit/ViewAttractionDetail.aspx?ID=5051305 http://www.environment.gov.au/indigenous/ipa/declared/lake-condah.html http://en.wikipedia.org/wiki/Budj_Bim http://museumvictoria.com.au/about/mv-blog/jun-2011/budj-bim-rangers/lake-condah-video/