

Non-Traditional Careers for Women



Workforce Planning Board
of Waterloo Wellington Dufferin

Non-Traditional Careers for Women

The Workforce Planning Board of Waterloo Wellington Dufferin (WPB) is a community directed, non-profit corporation leading Waterloo Region, Wellington and Dufferin County in their approach to workforce development and labour market planning. WPB functions as a neutral broker of research, disseminator of information, and facilitator of collaborative partnership development.

Operating as part of the Local Boards Network of Ontario, it is one of twenty-five (25) local planning board areas funded by the Ministry of Training, Colleges and Universities to conduct and distribute local labour market research and engage community stakeholders in a planning process that supports local solutions to local issues.

The WPB mandate is to provide guidance regarding important workforce and employment challenges facing Waterloo, Wellington and Dufferin.



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Executive Summary

The purpose of this report is to capture the current representation of women working in non-traditional careers within Waterloo Region, Wellington County and Dufferin County. The Workforce Planning Board primarily used specialized tabulations from 2006 census data to form a list of the top twenty careers which was compiled focusing on occupations where women represented less than twenty-five percent of the total workers. Three major occupational sectors: Natural and Applied Sciences and Related Occupations (Group 2), Occupations in Art, Culture, Recreation and Sport (Group 5) and Trades, Transport and Equipment Operations and Related Occupations (Group 7) will be the main focus of this report since females were shown to be the least represented within these occupations.

Informative career sheets on the top twenty non-traditional occupations are provided in Appendix 3 to give women more of an insight on the work, challenges and benefits associated with non-traditional careers in the workplace.

Key Points of Interest

This report will:

- provide a list of the top twenty non-traditional careers where women are currently under-represented.
- provide informative career sheets on the top twenty careers (see Appendix 3)
- highlight data showing female income as a percentage of male income in the three occupational major groups that are discussed
- detail the female component of the employed labour force by occupation and by highest certificate, diploma or degree
- review an additional forty non-traditional careers in lesser detail (see Appendix 2).



Non-Traditional Careers for Women

Introduction

Although, we continue to see an increase in the number of women entering the workforce, women's access to occupations where they are under-represented continues to remain an issue within Waterloo Region, Wellington County and Dufferin County.

There has also been an increase over the past few decades in the number of women who have pursued more professional fields by obtaining careers in business and finance, doctorate and dentistry, which usually have more job security and provide a higher pay. Many women, however, are still working in female dominated occupations such as clerical and administrative, sales and service, social science, nursing, teaching and religious studies. Many of these careers tend to have a lower pay level, less job security and less flexible hours compared to careers that are traditionally dominated by the male population.

This report aims to help them discover the full spectrum of careers that are available and provide additional data on women in the workforce.

As part of this research project, career sheets have been developed which will give women more information about the nature of the job, education required and the benefits and challenges associated with these occupations so they can further explore these careers if they choose. These career sheets are listed in Appendix 3.

Providing these opportunities to explore different career ideas can positively change the attitudes of women who haven't broken away from finding comfortable, traditional employment. It will hopefully influence them to pursue a new career which may better suit their family and lifestyle.

What is a Non-Traditional Career?

Our definition of a non-traditional career is one where women represent less than 25% of the total workers within a particular occupation. These jobs cross many different occupational sectors including science, technology, engineering, mathematics, manufacturing, transportation/logistics and skilled trades.

Most women have not considered these types of careers because these occupations are often usually seen as male dominated, even though they have higher pay scales, more job security and flexible hours. Women are likely to choose traditional careers where the hours are set and suit the needs of their family. Naturally, women have an adaptation to service related jobs since these careers have a social and community-orientated aspect to them. Women feel that these traditional/service sector jobs give them an overall satisfaction because it feels as if they are giving something back to the community.



There is also the misconception that non-traditional jobs are more individually orientated, and therefore alienate workers from their social surroundings. Some females also feel that the conditions associated with these jobs are not suited for women. These and many other issues, are some of the reasons as to why most women would rather enter a traditional female occupation rather than one that is non-traditional.

In order to resolve workforce shortages and banish stereotypes, more women need to be employed within non-traditional sectors. Reaching this goal may be difficult though since there is a lack of understanding and information available to women who may possibly pursue the path of a non-traditional career. It is

important that women who are employed in a non-traditional career come forward as mentors to help recruit other women into occupations that seek more female participation.

Labour Force Participation Rates

In 2006, the total labour force participation for Waterloo Region, Wellington and Dufferin County was 418,130. From this total, males represented 220,380 of the labour force and females represented 197,750. Although women are a smaller population in the labour force, their participation rate is only slightly lower than men at 67% versus 72% for males. Also in 2006, the female employment rate was 63% and the female unemployment rate stood at approximately 6%.

Labour Market Trends

The majority of jobs where there is an under-representation of female participants occur in Natural and Applied Sciences and Related Occupations (Group 2), Occupations in Art, Culture, Recreation and Sport (Group 5), Trades, Transport and Equipment Operations and Related Occupations (Group 7). Opportunity wise, all of the occupations in these particular sectors have an average growth rate, but each sector shows different outlooks for the future.

Mostly thought of as a traditional male occupation, careers in Information Technology are booming in this area and females are in high demand for an assortment of jobs. With approximately 27,000 new jobs available across Canada each year, only 13,000 students graduate per year from colleges and universities combined. Due to a decrease in enrollment at post-secondary institutions, the IT students of today are given the best opportunities available since there are more jobs than workers, and the industry is growing at a quicker than average pace. Significantly higher pay, flexible work hours and the option to work from home are just some of the incentives these occupations have to offer.

A study of college programs, whose students find a full-time job working in their field within six months of graduating, included Film and Television Production, Interior Design and Public Relations in Art, Culture, Recreation and Sport sector. Further research also found that careers in Audio and Video Recording Technician have an above average relative local concentration of work indicating that there is a current employment gap in the area. This means that there may be opportunities for women to undertake careers in these fields.

Between 2001 and 2006, Ontario has seen a 12% overall increase in employment within the skilled trades. Grants to help cover tuition costs, tax credits for employers of apprentices, tradesperson's tool deduction costs and cooperative education placements in high schools are all policy incentives that have been put in place to support the growth of this industry. The share of women in Ontario's trade's occupations has also risen 4% from 1996 to 2006 which brings the total female participation rate within the trades sector to 29%. Many individual trades, however, are still well below 25% female participation.

A 7.4% growth in the participation rate occurred among women within the Drafting Technologists and Technicians sector giving this career the biggest increase over the past ten years. Seeing that there has been an increased participation by women within the trades, these women can now serve as role models to entry-level females in future workplaces which will hopefully influence more women to enter non-traditional trades.

Within the next few years, the aging population will provide the community with a wide range of job opportunities. Employers will be pushing for female entrants especially in sectors that are usually occupied by the male population. By exposing high school females, recent immigrants or those women contemplating a career change to these non-traditional occupations, over the next five years we can expect to see higher participation rates within the industries which experience female participation of less than 25%.



Educational Attainment

In today's workplace, it is very uncommon to encounter an individual in a professional or higher skilled occupation that does not have some level of post-secondary education. Over the past few years, women have been making quite an impact within the post-secondary sector by enrolling in a variety of institutional programs at accredited schools or obtaining credentials from certified training courses.

By 2006, the total number of women who had obtained a certificate, diploma or degree within all occupational sectors was 158,225 compared to the 28,415 women who have no certificate, diploma or degree. When looking at the three major

occupational groups identified in this report, there is a substantial difference between those who have post-secondary and those that do not. All three sectors indicate that there has been a change in skill requirements since so many women have now obtained some sort of post-secondary to work in these fields. Female workers who have no certificate, diploma or degree are presumed to be older workers who became employed within these sectors when there was no requirement to have a higher degree of certification or in occupations where there is no minimum requirement.

Table 1: Educational Attainment by Occupational Major Group

OCCUPATIONAL MAJOR GROUP	No certificate, diploma or degree	Certificate, diploma or degree
Natural and Applied Sciences and Related Occupations	105	6,005
Occupations in Art, Culture, Recreation and Sport	420	5,240
Trades, Transport and Equipment Operators, and Related Occupations	1,175	3,515

Source: Statistics Canada 2006 Census, Special Tabulations, WPB

Female Income as a Percentage of Male Income

Gender patterns indicate that large populations of women work in health services, business-related occupations and within the social science field. Even though these occupations are highly skilled and require extensive training, women over-populate these jobs and are not sufficiently compensated compared to their male colleagues. For example, women in health services are being paid the least of this group and generating an income that is 46% of what male workers make.



Looking at Table 2, it is clear that the gender wage gap for female participants within non-traditional careers is shrinking. Women who are employed in these sectors are generating an income quite comparable to their male co-workers. Even though the women in these jobs are not being paid as much as their male counterparts, they are still being paid substantially more than women within other occupational fields. The total female income as a percentage of male income for all occupations averaged to be about 68% which is much lower than the percentage being earned by women in the non-traditional sectors.

Table 2: Average Income by Occupational Major Group

OCCUPATIONAL MAJOR GROUP	AVERAGE INCOME (as percentage of male income)
Business Finance and Administrative Occupations	68.5%
Natural and Applied Sciences and Related Occupations	76.2%
Health Occupations	46.2%
Occupations in Social Science, Education, Government Service and Religion	72.6%
Occupations in Art, Culture, Recreation and Sport	87.2%
Trades, Transport and Equipment Operators, and Related Occupations	74.1%
Total – All Occupations	67.7%

Source: Statistics Canada 2006 Census, Special Tabulations, WPB

Top 20 Non-Traditional Occupations

	NOC CODE	OCCUPATION	Percentage of Females in Occupation
1.	7241	Electricians (except industrial and power systems)	1.5%
2.	7321	Automotive service technicians, truck & bus mechanics and mechanical repairers	2.7%
3.	7284	Plasterers, drywall installers and finishers, and lathers	3.3%
4.	2242	Electronic service technicians (household and business equipment)	4.9%
5.	7272	Cabinetmakers	5.3%
6.	7294	Painters and decorators	5.3%
7.	7231	Machinists and machining and tooling inspectors	7.5%
8.	7232	Tool and die makers	7.5%
9.	7381	Printing press operators	8.0%
10.	7322	Motor vehicle body repairers	9.2%
11.	7265	Welders and related machine operators	7.3%
12.	2232	Mechanical engineering technologists and technicians	10.0%
13.	2147	Computer engineers (except software engineers)	10.1%
14.	2133	Electrical and electronics engineers	11.0%
15.	2141	Industrial and manufacturing engineers	12.1%
16.	2132	Mechanical engineers	12.4%
17.	2131	Civil engineers	12.7%
18.	2173	Software engineers and designers	13.9%
19.	2241	Electrical and electronics engineering technologists and technicians	14.0%
20.	5131	Producers, directors, choreographers and related occupations	14.3%

APPENDIX 1: Bibliography of Resources

Labour Market Information: Current Labour Market Statistics, Volume 6, Issue 12, December 2006: Ministry of Training, Colleges and Universities

Labour Market Information – Government of Canada
<http://www.labourmarketinformation.ca>

Job Futures – Service Canada
<http://www.jobfutures.ca>

Union Links - Ontario Federation of Labour CLC
http://www.ofl.ca/index.php/links/index_in/C72/

Women in IT...Where are they? : Backbone Magazine, May 2005 – Gail Balfour
http://www.backbonemag.com/Magazine/CoverStory_07050611.asp

Workforce Focus, Volume 4, Issue 6, March 2009: WPB

Workforce Focus, Volume 5, Issue 1, May 2009: WPB

APPENDIX 2:

Although some of these occupations may or not require a post-secondary education or training, the top 21 to 60 careers listed below are currently experiencing a shortage of female representation within the Waterloo Region, Wellington and Dufferin County areas. Most of these jobs are also experiencing average growth rates and will need workers over the next several years to meet demands and to replace the number of retirees.

21. Truck drivers
22. Residential and commercial installers and servicers
23. Taxi and limousine drivers and chauffeurs
24. Public works and maintenance labourers
25. Delivery and courier service drivers
26. Occupations unique to the Armed Forces
27. Mechanical assemblers and inspectors
28. Material Handlers
29. Plating, metal spraying and related operators
30. Landscaping and grounds maintenance labourers
31. Chefs
32. Industrial engineering and manufacturing technologists and technicians
33. Butchers, meat cutters and fishmongers, retail and wholesale
34. Computer programmers and interactive media developers
35. Security guards and related occupations
36. Specialist physicians
37. Landscape and horticultural technicians and specialists
38. Aircraft instrument, electrical and avionics mechanics, technicians and inspectors
39. Labourers in wood, pulp and paper processing
40. Computer network technicians
41. By-law enforcement and other regulatory officers, n.e.c
42. Drafting technologists and technicians
43. Painters and coaters, industrial
44. Chemical engineers
45. Technical sales specialists, wholesale trade
46. Rubber processing machine operators and related workers
47. Labourers in mineral and metal processing
48. Geologists, geochemists and geophysicists
49. Metalworking machine operators
50. Funeral directors and estimators
51. Operators and attendants in amusement, recreation and sport
52. Glass forming and finishing machine operators and glass cutters
53. Furniture and fixture assemblers and inspectors
54. Machining tool operators
55. Foundry workers
56. Labourers in metal fabrication

57. Shippers and receivers
58. Other service supervisors
59. Police officers (except commissioned)
60. Industrial designers

For more information on these careers, please visit:

<http://www.jobfutures.ca>

<http://www.labourmarketinformation.ca>

APPENDIX 3:

Career Sheets are attached for all top twenty non-traditional occupations.

ELECTRICIANS

(Except Industrial and Power System) (NOC Code: 7241)

What They Do...

- Conduct preventive maintenance programs and keep maintenance records
- Read and interpret drawings, circuit diagrams and electrical code specifications to determine wiring layouts for new or existing installations
- Pull wire through conduits and through holes in walls and floors
- Install brackets and hangers to support electrical equipment
- Install, replace and repair lighting fixtures and electrical control and distribution equipment, such as switches, relays and circuit breaker panels
- Splice, join and connect wire to fixtures and components for circuits
- Troubleshoot and isolate faults in electrical and electronic systems and remove and replace faulty components

Example Job Titles

- Construction electrician
- Domestic and rural electrician
- Electrician
- Apprentice electrician

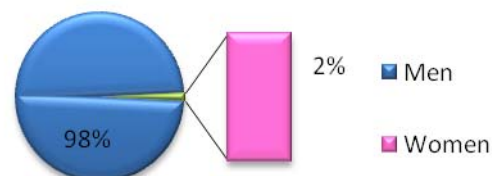
Useful High School Subjects

- Math
- Industrial Arts (Electricity)
- English

Education, Training & Experience

- Four-to five-year apprenticeship program
- Trade certification is compulsory for construction electricians in Ontario
- Trade certification is compulsory for domestic and rural electricians in Ontario
- The International Brotherhood of Electrical Workers require all electricians to have a Construction and Maintenance License
- Qualified electricians may also obtain interprovincial (Red Seal) trade certification

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$14.52
- Average \$/hour = \$20.92
- High wage \$/hour = \$24.44
- Wages are close to the average for occupations in trade, transport and equipment operations sector

Unions & Associations

- International Brotherhood of Electrical Workers (IBEW)
- Skilled Trades Association (STA)
- Electrical Contractors Association of Ontario

Industry Trends in Waterloo Wellington Dufferin

- Work prospects for this industry are rated FAIR due to employment growing at an average rate
- Retirement rate will likely be above average thus contributing to job openings
- The number of job seekers will likely match the number of job openings
- Competition within this field is very minimal since you will only be competing with unemployed electricians
- Those electricians familiar with home security/electronic house management systems are likely to excel since this field of work is becoming quite popular for home/small business owners



AUTOMOTIVE SERVICE TECHNICIANS and TRUCK MECHANICS

(NOC Code: 7321)

What They Do...

- Automotive service technicians;
 - Inspect motor in operation, road test motor vehicles, and test automotive systems and components using computerized diagnostic and other testing devices
 - Adjust, repair or replace parts and components of automotive systems including fuel, brake, steering and suspension, engine and drive train, emission control and exhaust, and electrical and electronic systems using hand tools and other specialized equipment
- Truck transport and trailer mechanics;
 - Adjust, repair or replace parts and components of commercial transport truck/truck trailer systems including chassis, frame, body, air brakes, steering, structural, brakes and electrical systems

Example Job Titles

- Automotive service technician
- Motor vehicle mechanic
- Truck and transport mechanic
- Tune-up specialist, motor vehicle

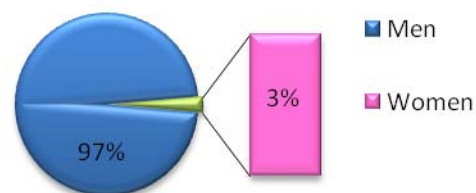
Useful High School Subjects

- Mechanics
- Business
- English
- Science
- Mathematics

Education, Training & Experience

- Both automotive service technicians and truck transport and trailer mechanics require the completion of a 4-year apprenticeship program OR a combination of over 4-years work experience which includes college or industry trade courses
- Trade certification for automotive service technicians (in all fields) is compulsory in Ontario
- Truck and transport mechanic, as well as, truck-trailer repair are both compulsory trade certifications in Ontario

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Wages are close to the average of those working in trades, transport and equipment operation sectors
- Low wage \$/hour = \$10.00
- Average \$/hour = \$17.00
- High wage \$/hour = \$25.00

Unions & Associations

- Canadian Auto Workers
- Canadian Trucking Alliance
- Automotive Industries Association of Canada

Industry Trends in Waterloo Wellington Dufferin

- Persons with good diagnostic and problem-solving abilities, and with training in basic electronics and computer courses, should have the best opportunities within this sector
- Many new jobs will be created in small retail operations that offer after-warranty repairs and other minor repairs that take less than four (4) hours to complete
- Due to the size of this sector, replacement needs are expected to create a substantial number of job openings yearly
- Increasingly complex motor vehicle systems, the use of propane vehicles and other technological/computerized innovations will increase the educational and skill requirements within this occupation



PLASTERERS, DRYWALL INSTALLERS and FINISHERS and LATHERS

(NOC Code: 7284)

What They Do...²

- Plasterers;
 - Apply, level and smooth coats of plaster using trowels, floats, brushes and spraying equipment
 - Finish corners and angles and create decorative designs
 - Mould and install ornamental plaster panels, cornices and trim
 - Spray acoustic materials or texture finish over walls and ceilings
- Drywall installers and finishers;
 - Measure, cut and fit drywall sheets for installation
 - Position and secure sheets to metal or wooden studs/joists
 - Fill joints, nail indentation, holes and cracks with joint compound
 - Fabricate and install suspended metal ceiling grids and place in panels to form acoustical and coffered ceilings
- Lathers;
 - Prepare wall and ceiling layouts
 - Install metal stud framing and furring for interior drywall/plaster walls and ceilings, using hand and power tools
 - Cut openings in lath for heating and ventilation piping, ducts and electrical outlets

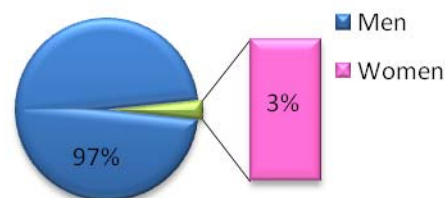
Example Job Titles

- Ceiling installer
- Drywall finisher
- Interior systems mechanic
- Plasterer

Useful High School Subjects

- Industrial Arts
- Math
- Sciences
- Physical Education

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Education, Training & Experience¹

- Completion of a 3-4 year apprenticeship program OR a combination of over 3-years work experience plus some college or industry courses
- Lather trade certification is available, but not compulsory in Ontario
- Interprovincial trade certification (Red Seal) is also available for qualified lathers (interior systems mechanic)

Earnings² (2007 Data)

- Wages are close to the average for all other technical, professional, and skilled occupations
- Low wage \$/hour = \$15.00
- Average \$/hour = \$21.20
- High wage \$/hour = \$30.62

Unions & Associations

- Canadian Home Builders' Association
- Construction Sector Council
- Ontario Home Builders' Association
- Acoustical Association Ontario

Industry Trends in Waterloo Wellington Dufferin^{1, 2}

- Employment in this occupation is expected to be good through 2010 in the area due to several large projects that are planned or underway
- This group is closely linked to the construction industry, not just residential but also for non-residential construction projects
- A large amount of the work does take place indoors, but this can be affected by weather related slowdowns in other trades
- Employment opportunities are significantly better during the peak summer months than during the winter months
- Within this occupation, those who have developed technical skills are the most likely to succeed
- The number of job seekers will likely match the number of job openings

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
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ELECTRONIC SERVICE TECHNICIANS (Household and Business Equipment)

(NOC Code: 2242)

What They Do...

- Install, maintain and repair household and business electronic equipment (i.e. televisions, stereo equipment, photocopiers, computers, peripherals, etc.)
- Inspect and test electronic equipment, components and assemblies using multimeters, circuit tester, oscilloscopes, logic probes and other electronic test instruments, tools and equipment
- Diagnose and locate circuit, component and equipment faults
- Adjust, align, replace or repair electronic equipment, assemblies and components following equipment manuals and schematics, and using soldering tools and other hand and power tools
- Complete work orders, test and maintenance reports

Example Job Titles

- Alarm systems technician
- Electronic games repairer
- Closed circuit television installer
- Public address system installer and repairer

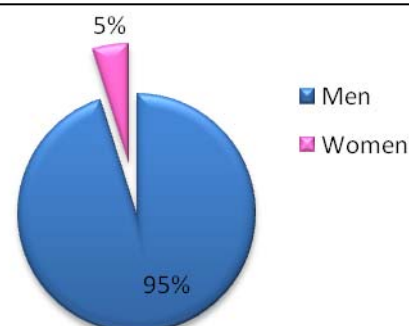
Useful High School Subjects

- Math
- Industrial Arts (Electronics)
- Sciences
- English

Education, Training & Experience

- A two-to three-year college program in electronics
- OR**
- A four (4) year apprenticeship program in electronic servicing and repair
- OR**
- College courses in electronics plus on-the-job training
 - Trade certification for an electronic technician – consumer products is available, but voluntary in Ontario

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$13.61
- Average \$/hour = \$19.98
- High wage \$/hour = \$24.33
- Earnings are close to average in relation to other occupations within the technical and skilled trades

Unions & Associations

- Ontario Electrical League
- Electro-Federation Canada
- Canadian Council of Technicians and Technologists

Industry Trends in Waterloo Wellington Dufferin

- The work prospects for this type of occupation is relatively GOOD due to an increasing demand within manufacturing companies for advanced technologies
- Demand will likely be strongest in the wholesale and computer sectors
- The number of job openings will likely keep pace with the number of job seekers, and many new entrants should be recent graduates
- Individuals entering this occupation are likely to succeed if they possess teamwork and “people” skills since the job requires constant interaction with the public



CABINETMAKER

(NOC Code: 7272)

What They Do...

- Study plans, specifications or drawings of articles to be made, or prepare specifications
- Mark outlines or dimensions of parts on wood
- Operate woodworking machines, such as power saws, jointers, mortisers and shapers, and use hand tools to cut, shape and form parts and components
- Trim joints and fit parts and subassemblies together to form complete unit using glue and clamps and reinforce joints using nails, screws or other fasteners
- Sand wooden surfaces and apply veneer, stain or polish to finished products
- Repair or restyle wooden furniture, fixtures and related products

Example Job Titles

- Cabinetmaker/Patternmaker
- Custom wood furniture maker
- Wood model maker
- Custom frame and mirror assembler

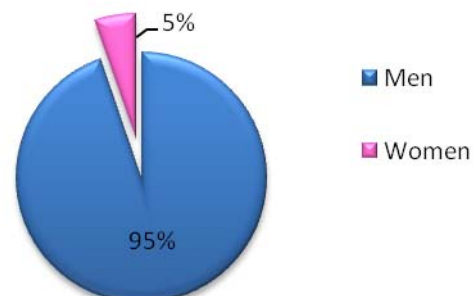
Useful High School Subjects

- Machine Shop
- Industrial Arts (Woodworking)
- Math

Education, Training & Experience

- To gain trade certification either a 4-year apprenticeship program
- OR**
- A combination of over 4-years' work experience and college courses in cabinetmaking
 - Qualified cabinetmakers may also obtain interprovincial (Red Seal) trade certification

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$10.83
- Average \$/hour = \$14.87
- High wage \$/hour = \$19.56

Unions & Associations

- Carpenters' Union
- Canadian Construction Association
- Carpenters' District Council of Ontario

Industry Trends in Waterloo Wellington Dufferin

- Employment rates will likely be average due to an anticipated economic upturn leading to a growth in the construction industry, especially residential construction
- Improved tools/techniques and the manufacturing of factory-built cabinets will increase productivity
- Although the retirement rate will likely be average, the number of retiring workers should contribute to job openings
- The number of job seekers will likely match the number of job openings
- Individuals within this field are more likely to succeed in the made-to-order specialty market if they possess a high level of skills



PAINTERS AND DECORATORS

(NOC Code: 7294)

What They Do...

- Read specifications to determine quantities of materials required
- Prepare and clean surfaces using methods such as scraping, sanding, sandblasting, hydro-blasting and steam-cleaning; remove old wallpaper and loose paint; repair cracks and holes in walls; and sandpaper and apply sealer
- Mix and thin paint to obtain desired colour and texture
- Apply paint or other materials, such as stains, lacquer, enamel, oil, varnish, fiberglass, metal coating or fire retardant using brushes, rollers or spray equipment
- Measure, cut and apply wallpaper or fabric to walls
- Assemble and erect scaffolding and swing stages
- Advise customer on selection of colour schemes and choice of wall coverings

Example Job Titles

- Decorator and Painter
- Industrial Painter
- Maintenance Painter
- Vinyl Paperhanger

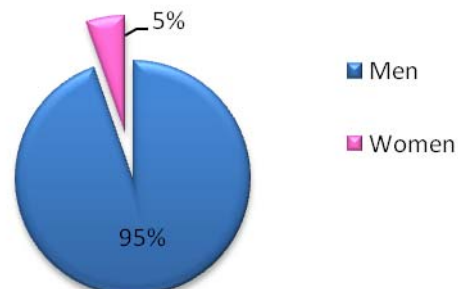
Useful High School Subjects

- Industrial Arts
- Business English
- Math

Education, Training & Experience

- Complete a three-to four-year apprenticeship program
- OR
- Over 3-years work experience with some college or industry related courses is required in order to be eligible for trade certification
 - Interprovincial trade certification (Red Seal) is also available to qualified painters and decorators

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$12.10
- Average \$/hour = \$15.58
- High wage \$/hour = \$16.71

Unions & Associations

- International Union of Painters and Allied Trades
- The Ontario Council of Painters (OCP)
- Ontario Painting Contractors' Association

Industry Trends in Waterloo Wellington Dufferin

- Work prospects within this industry will continue to be FAIR since the employment growth rate will likely be below average
- This is due to the expected decline in the residential construction industry
- The number of persons leaving for retirement will be less than average, thus leaving few foreseeable job openings
- The number of job seekers will likely match the number of job openings
- Those entering the industry will be competing with a large amount of unemployed workers
- Individuals who develop technical and interpersonal skills are more likely to succeed within this industry



MACHINISTS and MACHINING and TOOLING INSPECTORS

(NOC Code: 7231)

What They Do...²

- Machinists;
 - Read and interpret engineering drawings, blueprints, charts and tables or study sample parts to determine machining operation to be performed, and plan best sequence of operations
 - Compute/verify dimensions and tolerances and measure and lay out work pieces
 - Set up, operate and maintain a variety of machine tools including computer numerically controlled (CNC) tools to perform precision, non-repetitive machining operations
- Machining and tooling inspectors;
 - Verify dimensions of machined parts or tooling using micrometers, verniers, calipers, height gauges, optical comparators, co-ordinate measuring machines (CMM) and other specialized measuring instruments
 - Maintain, repair and calibrate precision measuring instruments

Example Job Titles

- Automotive Machinist
- Aviation Machinist
- Machining Inspector
- Tooling Inspector

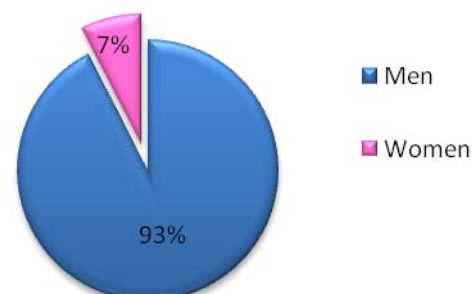
Useful High School Subjects

- Machine Shop
- Blueprint Reading
- Math
- Computer-related courses
- English

Education, Training & Experience¹

- Must complete a 4-year apprenticeship program
- OR
- Have a combination of over 4-years work experience plus some college or industry courses in machining
 - Qualified machinists may also obtain interprovincial (Red Seal) trade certification

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Wages are average when compared to other trades in technical, professional and skilled occupations
- Low wage \$/hour = \$12.37
- Average \$/hour = \$19.27
- High wage \$/hour = \$26.18

Industry Trends in Waterloo Wellington Dufferin²

- Seeing as employment in this occupation is concentrated within the manufacturing sector, demand for machinist is highly sensitive to manufacturing business cycle, and general economic conditions
- Work of machinists continues to be transformed by technological change
- Machinists must be willing to update their skills on a continuous basis to adapt to changing technology
- Technically advanced equipment and the need for increased speed and quality require additional skills
- Employers are seeking skilled workers who can operate increasingly advanced equipment and a variety of conventional and CNC machines

Unions & Associations

- Automotive Parts Manufacturers' Association
- Canadian Aviation Maintenance Council
- Canadian Tooling & Manufacturing Association

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

TOOL and DIE MAKERS

(NOC Code: 7232)

What They Do...²

- Read and interpret engineering drawings and specifications of tools, dies, prototypes or models
- Prepare templates and sketches, and determine work processes
- Compute dimensions and tolerances and set up machine tools
- Position, secure, measure and work metal stock or castings to lay out for machining
- Set up, operate and maintain a variety of conventional and computer numerically controlled (CNC) machine tools to cut, turn, mill, plane, drill, bore, grind or otherwise shape workpiece to prescribed dimensions and finish
- Verify machined parts for conformance to specifications using precision measuring instruments
- Test completed tools, dies, jigs or fixtures for proper operation

Example Job Titles

- Die Finisher
- Die Maker
- Metal Mould Maker
- Metal Patternmaker

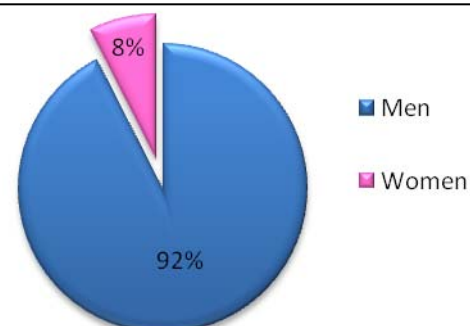
Useful High School Subjects

- Industrial Arts (Metalworking)
- Math
- Physics
- Drafting
- Blueprint Reading

Education, Training & Experience¹

- Complete a four-to five-year tool and die making apprenticeship program
- OR**
- Have a combination of over 5-years work experience plus college or industry courses in tool and die
 - Qualified tool and die makers can also obtain interprovincial (Red Seal) trade certification

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Wages are about average compared to other occupations within the skilled trades
- Low wage \$/hour = \$15.25
- Average \$/hour = \$25.10
- High wage \$/hour = \$33.00

Unions & Associations

- Canadian Tooling & Machining Association
- Canadian Association of Moldmakers
- Canadian Die Casters Association

Industry Trends in Waterloo Wellington Dufferin²

- Employment for tool and die makers is highly sensitive to business cycles within manufacturing
- Competition can be stiff for highly qualified workers
- Skill shortages are more likely to be a concern for smaller operations and in areas with a smaller labour pool
- Areas where the auto sector is a major employer, there is a greater payout for higher wages and benefits
- As the workforce is ageing, future demand is expected to replace the retiring workers
- Overall employment for this occupation is expected to increase faster than the average for all occupations

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

PRINTING PRESS OPERATORS

(NOC Code: 7381)

What They Do...

- Review job orders to determine job specifications such as production time, colour sequence and quantities required, and advise press crew of these specifications
- Mount plates or cylinders and make necessary adjustments
- Fill ink fountains and take measurements, make adjustments and determine settings to control colour and viscosity
- Set up press and check samples for ink coverage, alignment and registration
- Monitor regular press run for quality consistency using computer control console and make adjustments if required
- Set up and adjust in-line binding and finishing equipment

Example Job Titles

- Commercial Press Operator
- Printing Press Operator
- Lithographic Printer
- Thermographic Printer

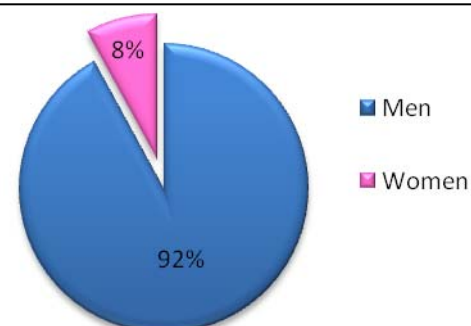
Useful High School Subjects

- Math
- Mechanics
- First Aid
- Computer Basics
- English

Education, Training & Experience

- Completion of a college program in printing technology
- OR**
- A combination of on-the-job training plus college or industry related courses

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$11.38
- Average \$/hour = \$18.50
- High wage \$/hour = \$19.33
- Earnings are close to average for occupations in other equipment operation sectors

Unions & Associations

- Canadian Printing Industries Association
- Ontario Printing and Imaging Association

Industry Trends in Waterloo Wellington Dufferin

- Due to the increasing growth and use of electronic media and the internet, the growth rate within this industry is slightly below average
- Automation and computerization of the printing press will likely improve productivity, allowing employers to do more with fewer workers
- Those entering this industry will primarily face unemployed workers as their competition
- Workers with a strong background in computers, computerized printing press, and electronic media are more likely to succeed compared to those who are less experienced



MOTOR VEHICLE BODY REPAIRERS

(NOC Code: 7322)

What They Do...

- Mix paint, blend and match colours
- Apply primers and repaint surfaces using brush or spray guns
- Repair and replace glass and interior components
- Inspect repaired vehicles and test drive vehicles for proper handling
- Review damage report and estimates of repair costs and plan work to be preformed
- Repair and replace front end components, body components, doors and frame and underbody components
- Hammer out dents, buckles and other defects
- Operate soldering equipment or use plastic filler to fill holes, dents and seams
- File, grind and sand repaired body surfaces using hand and power tools
- Straighten bent frames using frame and underbody pulling

Example Job Titles

- Autobody Technician
- Painter – Motor Vehicle Repair
- Repair Shop Estimator – Automotive
- Vintage Car Renovator

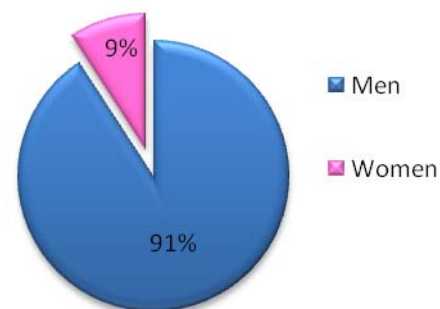
Useful High School Subjects

- Mechanics
- Business
- English
- Science
- Mathematics

Education, Training & Experience

- Completion of three-to four-year motor vehicle body repair apprenticeship
- OR**
- Combination of over 3-years of work experience in the motor vehicle body repair trade plus completion of a college automotive body repair program
 - Certification for motor vehicle body repair (metal and paint) is compulsory in Ontario
 - Completion of a two-to three-year automotive painter apprenticeship
- OR**
- Combination of one year work experience plus completion of a college program in automotive painting

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$11.89
- Average \$/hour = \$16.41
- High wage \$/hour = \$18.60

Industry Trends in Waterloo Wellington Dufferin

- Prospects within this industry are predicted to be FAIR since the employment growth rate will be close to average
- The number of retiring workers should contribute to the number of available job openings
- Those entering this field of work will be competing with recent school-leavers and those who are unemployed
- Workers within the automotive industry are likely to succeed if they develop technical and interpersonal skills
- Also, those willing to commit to life long learning in both technical and non-technical areas are also likely to be successful

Unions & Associations

- Canadian Auto Workers
- Canadian Automotive Repair and Service
- The United Auto Workers



WELDERS and RELATED MACHINE OPERATORS

(NOC Code: 7265)

What They Do...²

- Read and interpret blueprints or welding process specifications
- Operate manual or semi-automatic welding equipment to fuse metal segments using processes such as gas tungsten arc (GTAW) and plasma arc (PAW)
- Operate manual or semi-automatic flame-cutting equipment
- Operate brazing and soldering equipment
- Operate metal shaping machines such as brakes, shears and other metal straightening/bending machines
- Operate previously set up welding machines such as spot, butt and seam resistance or gas and arc welding machines to fabricate or repair metal parts
- Start up, shut down, adjust and monitor robotic welding production line
- Assist with the maintenance and repair of welding, brazing and soldering equipment

Example Job Titles

- Aviation Welding Technician
- Brazing Machine Setter
- Soldering Machine Operator
- Welder-fitter

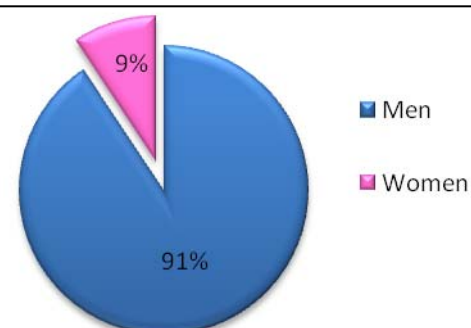
Useful High School Subjects

- Industrial Arts (Metalworking)
- Math
- Drafting
- Physics
- Computer-related Courses

Education, Training & Experience¹

- Completion of a 3-year apprenticeship program
- OR**
- A combination of over 3-years of work experience in welding plus some college or industry related courses in welding
 - Interprovincial trade certification (Red Seal) is also available to qualified workers

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Low wage \$/hour = \$14.62
- Average \$/hour = \$20.43
- High wage \$/hour = \$31.62
- Wages within this industry are average when compared to all other technical, professional and skilled trades

Unions & Associations

- Canadian Welding Association
- Canadian Welding Bureau
- Ontario Pipe Trades Council
- Canadian Aviation Maintenance Council

Industry Trends in Waterloo Wellington Dufferin²

- Employment opportunities for welders and soldering machine operators are dependent upon the activity in the manufacturing sector
- New technologies and techniques such as laser beam and electron beam welding, and new fluxes are improving the results of welding, making it applicable to a wider assortment of jobs
- Manual welders, however, especially those with a wide variety of high level skills, will still be required for sophisticated fabrication tasks and repair work that do not lend themselves to automation
- Demand will be greater for skilled welders as opposed to soldering machine operators
- Retirement will not be an issue in the near future as this occupation has an average age profile

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

MECHANICAL ENGINEERING TECHNOLOGISTS and TECHNICIANS

(NOC Code: 2232)

What They Do...¹

- Carry out a range of mechanical tests and analyses of machines, components and materials
- Install, repair and maintain machinery and equipment
- Prepare and interpret conventional and computer-assisted design (CAD) engineering designs, drawings, and specifications for machines and components, power transmission systems, process piping, heating, ventilating and air-conditioning systems
- Conduct test and analyses of machines, components and materials to determine their performance, strength, response to stress and other characteristics
- Design moulds, tools, dies, jigs and fixtures for use in manufacturing process
- Inspect mechanical installations and construction

Example Job Titles

- Heating Designer
- Mechanical Engineering Technologist
- Thermal Station Technician
- Tool Designer

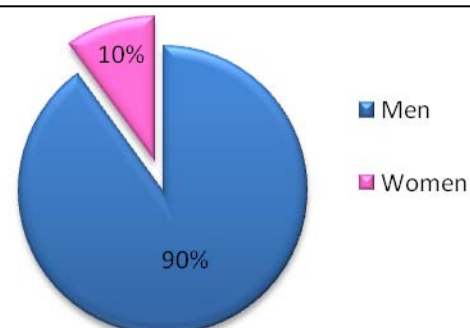
Useful High School Subjects

- Math
- Physics
- Chemistry
- Drafting
- Blueprint Reading

Education, Training & Experience¹

- Mechanical Engineering Technologists:
 - Completion of a two-to three-year college program in mechanical engineering technology
- Mechanical Engineering Technicians:
 - Completion of a one-to two-year college program in mechanical engineering technology
- Period of supervised work experience, usually 2-years, is required before certification by a provincial association

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Low wage \$/hour = \$18.75
- Average \$/hour = \$24.57
- High wage \$/hour = \$32.00
- Wages are above average compared to other technical, professional, and skilled occupations

Unions & Associations

- Ontario Association of Certified Engineering Technicians and Technologists
- Canadian Advanced Technology Association

Industry Trends in Waterloo Wellington Dufferin²

- Employment for this occupation is expected to grow about as fast as the average for all occupations within the next year
- More than half of technologists and technicians work in the manufacturing sector, which continues to undergo modernization
- The growing use of advanced technologies, such as computer-aided design and drafting and computer simulation, will continue to moderate employment growth
- Individuals in these occupations should plan for continuous retraining and professional development to keep up with the rapidly changing technology within this field
- Those entering this field will be competing with a large number of recent graduates

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

COMPUTER ENGINEERS

(Except Software Engineers and Designers) (NOC Code: 2147)

What They Do...²

- Analyze user's requirements, and design and develop systems architecture and specifications
- Research, design, develop and integrate computer and telecommunications hardware such as microprocessors, integrated circuit boards and semiconductor lasers
- Develop and conduct design verification simulations and prototype bench tests of components
- Establish and maintain relationships with suppliers and clients
- Research, design and develop information and communication system network architecture
- Research, evaluate and integrate network system and data communication hardware and software
- Assess, document and optimize the capacity and performance of information and communication system networks

Example Job Titles

- Computer Engineer
- Fibre-Optic Network Designer
- Hardware Engineer
- Wireless Communications Network Engineer

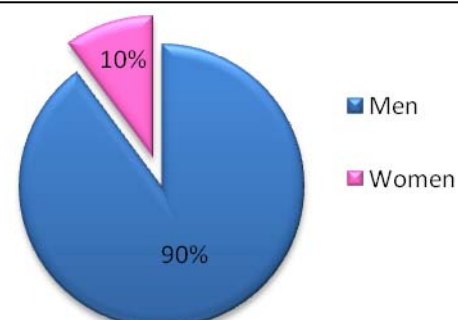
Useful High School Subjects

- Computer Science
- Math
- Business
- English

Education, Training & Experience¹

- A university degree in computer engineering, electrical/electronics engineering, engineering physics or computer science
- A license from a provincial association of professional engineers to approve engineering drawings/reports and to practice as a professional engineer (P. Eng.)
- You are eligible for license registration following graduation from an accredited educational program, after 3 or 4-years of supervised work experience in engineering, and after passing a professional practice exam

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Low wage \$/hour = \$23.08
- Average \$/hour = \$33.45
- High wage \$/hour = \$42.16
- Earnings within this field are above average for all professional occupations

Unions & Associations

- Engineers Canada
- Information and Communications Technology Council
- Professional Engineers of Ontario

Industry Trends in Waterloo Wellington Dufferin²

- Employment prospects for computer engineers appear to be average throughout the next year
- Although, demand for information technology will continue to create new opportunities for graduates which should meet industry needs
- Growth in employment of hardware engineers is expected in the computer systems design and related services industry
- This occupation has a relatively young demographic with 80% under the age of 45
- Experienced computer engineers that keep up-to-date with new and changing technologies will face better prospects in securing employment within this industry

Source ¹: <http://www.jobfutures.ca>

Source ²: <http://www.labourmarketinformation.ca>



Workforce Planning Board
of Waterloo Wellington Dufferin

ELECTRICAL and ELECTRONICS ENGINEERS

(NOC Code: 2133)

What They Do...²

- Conduct research into the feasibility, design, operation and performance of electrical generation and distribution networks, electrical machinery and components and electronic communications, instrumentation and control systems, equipment, and components
- Prepare material costs and timing estimates, reports and design specifications for electrical and electronic systems and equipment
- Design electrical and electronic circuits, components, systems and equipment
- Develop maintenance and operating standards for electrical and electronic systems and equipment
- Investigate electrical or electronic failures
- Prepare contract documents and evaluate tenders for construction or maintenance

Example Job Titles

- Control Systems Engineer
- Electrical Network Engineer
- Roadway Lighting Design Engineer
- Television Systems Engineer

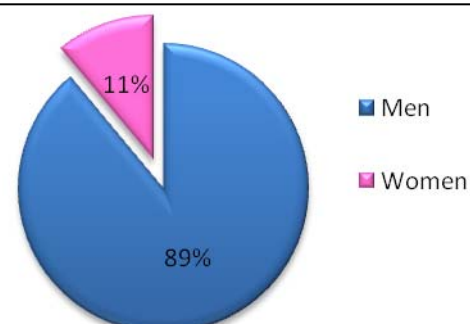
Useful High School Subjects

- Math
- Science
- Industrial Arts (Electronics)
- English

Education, Training & Experience¹

- A university degree in electrical or electronics engineering (or in a related field of engineering)
- A license from a provincial/territorial association of professional engineers to approve engineering drawings/reports and to practice as a professional engineer (P. Eng.)
- Eligible for license registration following graduation, after 3 or 4-years of supervised work experience in engineering, and after passing a professional practice examination

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Low wage \$/hour = \$20.67
- Average \$/hour = \$29.91
- High wage \$/hour = \$43.98
- Wages are above average compared to all other professional occupations

Unions & Associations

- Ontario Electrical League
- Professional Engineers of Ontario
- Association of Canadian Engineering Companies

Industry Trends in Waterloo Wellington Dufferin²

- Employment for this occupation is expected to grow about as fast as the average for all occupations through the next year
- As companies continue to introduce new technologies, employment opportunities for these workers will improve
- Engineers will have to continually upgrade their skills in order to keep up with the rapid changes in technology
- Firms face intense international competition requiring their engineers to be at the leading edge of their field
- There are likely to be significant new opportunities for these engineers in setting up computerized production systems
- This may require electrical and electronic engineers to work more closely with mechanical engineers

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

INDUSTRIAL and MANUFACTURING ENGINEERS

(NOC Code: 2141)

What They Do...

- Conduct studies of the reliability and performance of plant facilities and production or administrative systems
- Develop maintenance standards, schedules and programs
- Establish programs and conduct studies to enhance industrial health and safety or to identify and correct fire and other hazards
- Evaluate or assess industrial facilities
- Plan and design plant layouts and facilities
- Study new machinery and facilities and recommend or select efficient combinations
- Develop flexible or integrated manufacturing systems and procedures
- Conduct studies and implement programs to determine optimum inventory levels for production and to allow optimum utilization of machinery, materials and resources

Example Job Titles

- Cost Engineer
- Industrial Engineer
- Quality Control Engineer
- Work Measurement Engineer

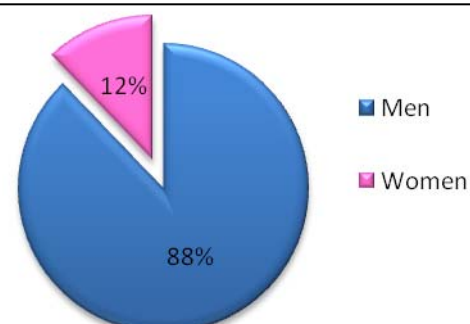
Useful High School Subjects

- Math
- Physics
- Chemistry
- Computer-related Courses

Education, Training & Experience

- A bachelor's degree in industrial engineering or in a related engineering discipline is required
- Licensing by a provincial/territorial association of professional engineers is required to approve engineering drawings and reports and to practice as a Professional Engineer (P. Eng.)
- Engineers are eligible for registration following graduation, after 3 to 4-years of supervised work experience and passing a professional practice examination

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings (2007 Data)

- Low wage \$/hour = \$17.97
- Average \$/hour = \$29.47
- High wage \$/hour = \$29.68
- Wages are above average all other professional and natural/applied science occupations

Unions & Associations

- Consulting Engineers of Ontario
- Professional Engineers of Ontario
- Ontario Engineering Association

Industry Trends in Waterloo Wellington Dufferin

- Within the next year, the employment growth rate will likely be above average because of the strength of the electrical and electronic products, automotive and other transportation equipment industries
- The retirement rate is predicted to be about average, therefore the number of retiring workers should contribute to future job openings
- Although, the number of job seekers will likely exceed the number of job openings
- Those entering this field will be competing with recent graduates
- Engineers that wish to succeed within this field will do so if they possess "people" and teamwork skills



MECHANICAL ENGINEERS

(NOC Code: 2132)

What They Do...¹

- Conduct research into the feasibility, design, operation and performance of mechanism, components and systems
- Plan and manage projects, and prepare material, cost and timing estimates, reports and design specifications for machinery and systems
- Design power plants, machines, components, tools, fixtures and equipment
- Analyze dynamics and vibrations of mechanical systems and structures
- Develop maintenance standards, schedules and programs; and provide guidance to industrial maintenance crews
- Investigate mechanical failures or unexpected maintenance problems
- Prepare contract documents and evaluate tenders for industrial construction or maintenance

Example Job Titles

- Automotive engineer
- Engineer, power generation
- Nuclear engineer
- Robotics engineer

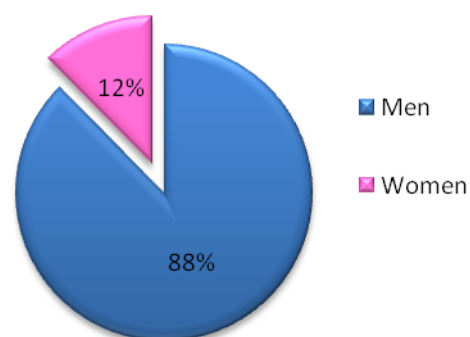
Useful High School Subjects

- Math
- Physics
- Chemistry
- English

Education, Training & Experience¹

- University degree in mechanical engineering or in a related field of engineering
- A license from a provincial/territorial association of professional engineers to approve engineering drawings/reports and to practice as a professional engineer (P.Eng.)
- Eligible for license registration following graduation from an accredited program, after 3-4 years of supervised work experience in engineering and after passing a professional practice examination

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Low wage \$/hour = \$19.23
- Average \$/hour = \$26.02
- High wage \$/hour = 36.24
- Wages are fairly average compared to other professional occupations within this field

Industry Trends in Waterloo Wellington Dufferin^{1, 2}

- Rise in the Canadian dollar and the increase in international competitiveness are pushing manufacturers to adopt new technologies
- Emerging technologies in information technology, biotechnology, and nanotechnology may generate new job opportunities for mechanical engineers
- Increased emphasis on quality control in production will require individuals with up-to-date skills and with knowledge of quality control processes to meet international quality standards
- Employers will be seeking individuals with general and specific computer skills, as well as, communication and teamwork skills
- Although the retirement rate will likely be average, the number of retiring workers should contribute to job openings

Unions & Associations

- Engineers Canada
- Ontario Society of Professional Engineers
- Canadian Society for Mechanical Engineers
- Professional Engineers of Ontario

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www/labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

CIVIL ENGINEERS

(NOC Code: 2131)

What They Do...¹

- Conduct feasibility studies, economic analyses, municipal and regional traffic studies, environmental impact studies or other investigations
- Monitor air, water and soil quality and develop procedures to clean up contaminated sites
- Conduct technical analyses of survey and field data for development of topographic, soil, hydrological or other information and prepare reports
- Prepare contract documents and review and evaluate tenders for construction projects
- Confer with clients and other members of the engineering team and conduct research to determine project requirements
- Plan and design major civil projects such as buildings, roads, bridges, dams, water and waste management systems and structural steel fabrications
- Interpret, review and approve survey and civil design work
- Ensure construction plans meet guidelines and specifications of building codes and other regulations

Example Job Titles

- Bridge Engineer
- Highway Engineer
- Public Works Engineer
- Transportation Engineer

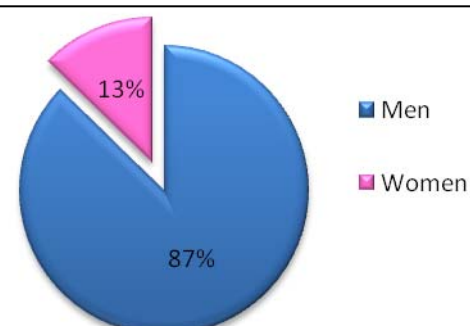
Useful High School Subjects

- Math
- Physics
- Computer-related Courses
- English

Education, Training & Experience¹

- A university degree in civil engineering or in a related field of engineering
- License from a provincial/territorial association of professional engineers to approve engineering drawings/reports and to practice as a professional engineer (P. Eng.)
- Eligible for registration following graduation, after three or four years of supervised work experience in engineering, and after passing a professional practice examination

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Low wage \$/hour = \$15.52
- Average \$/hour = \$29.42
- High wage \$/hour = \$36.75
- Wages are average when comparing to other occupations within the natural and applied sciences

Unions & Associations

- Association of Canadian Engineering Companies
- Canadian Hydrographic Association
- Professional Engineers of Ontario

Industry Trends in Waterloo Wellington Dufferin^{1, 2}

- Population growth, infrastructure spending and continued activity in the residential, institutional, commercial and industrial sectors will provide employment opportunities
- Opportunities will be better for those with specialties in water and wastewater management, transport planning, urban planning and sustainability
- As the population and economy grow, more civil engineers will be needed to design, construct and maintain highways, bridges, water supply, and large buildings and building complexes
- The number of retiring workers should contribute to job openings
- Number of job seekers will likely exceed the number of job openings but this shouldn't have a significant impact on the work prospects

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

SOFTWARE ENGINEERS and DESIGNERS

(NOC Code: 2173)

What They Do...¹

- Collect and document user's requirements and develop logical and physical specifications
- Research, evaluate and synthesize technical information to design, develop and test computer-based systems
- Develop data, process and network models to optimize architecture and to evaluate the performance and reliability of designs
- Plan, design and co-ordinate the development, installation, integration and operation of computer-based systems
- Assess, test, troubleshoot, document, upgrade and develop maintenance procedures for operating systems, communications, environments and applications software

Example Job Titles

- Computer Software Engineer
- Software Engineer
- Software Designer
- Technical Architect – Software

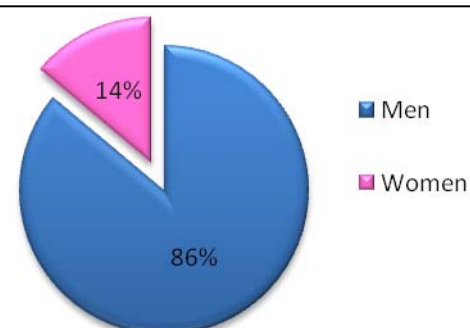
Useful High School Subjects

- Computer-related courses
- Industrial Arts (Electronics)
- Math
- Business

Education, Training & Experience¹

- Bachelor's degree in either computer science, computer systems engineering, software engineering or mathematics; OR completion of a college program in computer science
- License by either a provincial or territorial engineering association in order to practice as a Professional Engineer (P.Eng.)
- May obtain license following graduation from an accredited educational program, 3-4 years of supervised work experience and passing a professional practice exam

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Above average for occupations in the natural and applied sciences
- Low wage \$/hour = \$25.00
- Average \$/hour = \$36.38
- High wage \$/hour = 55.77

Unions & Associations

- Canadian Council of Professional Engineers
- Professional Engineers of Ontario
- Engineers Canada

Industry Trends in Waterloo Wellington Dufferin^{1, 2}

- Local employment opportunities for software engineers are expected to be FAIR due to an increase in enrollment within this field of study
- Waterloo Region is known around the world for its intellectual knowledge and high-tech industry base, thus improving the outlook for employment opportunities
- Retirement rate will likely be below average, and the number of retiring workers should not contribute significantly to job openings
- Software development skills currently in demand include Java, Visual C++, Visual Basic, SQL Sever, Oracle DB and MS Access
- Consulting and freelance work are areas of growth within this occupation as well

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
of Waterloo Wellington Dufferin

ELECTRICAL and ELECTRONICS ENGINEERING TECHNOLOGISTS and TECHNICIANS

(NOC Code: 2241)

What They Do...¹

- Inspect, test, adjust and evaluate incoming electrical, electro-mechanical and electronic components and assemblies to ensure conformance with product specifications and tolerances
- Assist in building and testing prototypes to specifications
- Install, operate and maintain electrical and electronic equipment and systems
- Collect and compile operational or experimental data and assist in the preparation of estimates, schedules, budgets and reports
- Calibrate electrical or electronic equipment and instruments according to technical manuals and written instructions
- Carry out applied research
- Write specifications, schedules and technical reports and control schedules and budgets

Example Job Titles

- Communications Technologist
- Electrical Engineering Technician
- Electronics Design Technologist
- Lighting Technologist

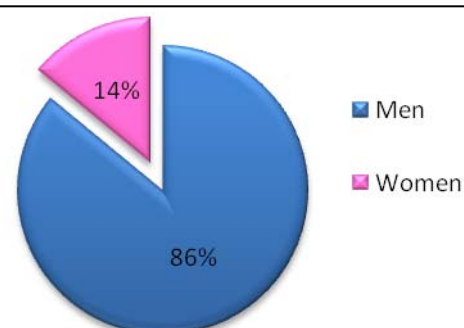
Useful High School Subjects

- Math
- Sciences
- Industrial Arts (Electronics)
- English

Education, Training & Experience¹

- Technologist: Two-to three- year college program in electrical/electronics engineering technology, computer engineering technology, telecommunications technology, or an equivalent area of study
- Technician: One-to two- year college program in electrical/electronics engineering technology
- Certification by a provincial association which is obtained after two years of supervised work experience

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Earnings² (2007 Data)

- Above average for all technical, professional, and skilled occupations
- Low wage \$/hour = \$15.10
- Average \$/hour = \$22.71
- High wage \$/hour = \$31.19

Industry Trends in Waterloo Wellington Dufferin²

- The current downturn in the global economy could have a lingering negative effect in the auto parts manufacturing sector due to numerous layoffs and plant closures
- Demand has been increasing in the electrical/electronics product industry due to strong growth
- The number of job seekers is keeping pace with the number of job openings, and many new entrants are recent graduates/immigrants
- Innovations and rapid change in microcomputers and telecommunications means that people working in this occupational group will need continuous upgrading and professional development to keep up with the changes

Unions & Associations

- Association of Canadian Engineering Companies
- Canadian Council of Technicians and Technologists
- Ontario Electrical League

Source ¹: <http://www.jobfutures.ca>Source ²: <http://www.labourmarketinformation.ca>

Workforce Planning Board
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PRODUCERS, DIRECTORS, CHOREOGRAPHERS and RELATED OCCUPATIONS

(NOC Code: 5131)

What They Do...

- **Film, television and radio producers** manage the production of motion pictures, television shows, and radio programs
- **Directors** interpret scripts, select casts, and direct performers/other aspects of productions
- **Record producers** plan and co-ordinate musical recordings
- **Directors of photography** plan and co-ordinate the photography of motion pictures
- **Conductors** select and interpret musical works, and lead bands, orchestras, and choirs
- **Arrangers** adapt and modify musical compositions to convey desired themes
- **Musicians** play one or more instruments
- **Singers** sing musical arrangements
- **Actors** perform roles in motion picture, television, and radio productions
- **Painters, sculptors and other visual artists** create original paintings, drawings, sculptures, engravings, and other art works

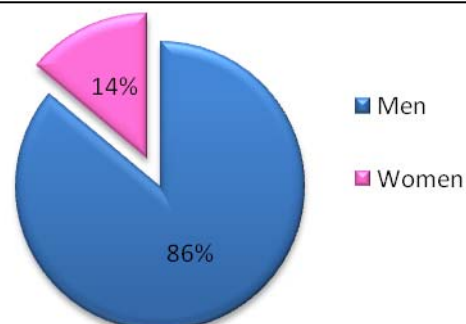
Example Job Titles

- Artistic Director
- Film Editor
- Producer
- Record Producer

Useful High School Subjects

- Art
- English (Composition)
- Drama
- Music

Gender Comparison for Waterloo Wellington Dufferin, Census 2006



Education, Training & Experience

- A university degree, college diploma or other post-secondary specialized training in your area of work
- May need experience and to be able to demonstrate directing, creative or performing skills
- Membership in a related guild or union

Earnings (2007 Data)

- Low wage \$/hour = \$15.00
- Average \$/hour = \$29.24
- High wage \$/hour = \$45.68
- Wages are close to the average for occupations in the art, culture, recreation and sport sector

Unions & Associations

- ACTRA Performers Guild - Ontario
- Canadian Actors' Equity Association
- Directors Guild of Canada
- Playwrights Guild of Canada

Industry Trends in Waterloo Wellington Dufferin

- The employment growth rate will likely be average because of Canada's ability to attract foreign production and the continuing positive impact of increased government spending on art/culture
- The number of job seekers will likely match the number of job openings
- Those entering this field of work will be competing with a large number of recent graduates
- It is essential to have good business skills to manage your career





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