ser mujer, ser ingeniera

« La femme est l´agent secret de la modernité »
Edgar Morin : *Journal de Plozévet* (1965)

ESPAÑA

(1957) «La "niña de la guerra" Araceli Sánchez Urquijo fue la primera titulada en Caminos que ejerció en España. "Las mujeres de la limpieza sólo pueden entrar a la fábrica cuando hayan salido los obreros", espetó tajante el portero de la empresa suiza de ingeniería Isodel Sprecher al ver en la puerta a Araceli Sánchez Urquijo. El hombre se quedó mudo durante unos cuantos días cuando comprobó que la señora que tenía ante sí era ingeniera de Caminos y uno de los cinco candidatos para un puesto que ofertaba la empresa, ubicada en la madrileña calle de Áncora. Era el año 1957. Ninguna mujer había trabajado antes en España como ingeniera». [*El País*, 4/2/99].

(1973) Termina sus estudios la primera mujer ingeniera de caminos, canales y puertos, Carmen de Andrés Conde. [La primera ingeniera industrial en España es Pilar Careaga Basabe, que acaba sus estudios en 1929, mientras que la primera arquitecta, Matilde Ucelay Maortúa, acabará los suyos en 1936; en el campo de la Medicina, la incorporación de la mujer había sido mucho más temprana: en 1878 Elena Maseras Ribera egresará de las aulas de la Universidad de Barcelona, y en 1882 María Dolores Aleu Riera y Martina Castells Ballespí obtendrán en la Universidad Central el doctorado en medicina].

(1993) Por primera vez en su historia bicentenaria, es nº1 de promoción en la Escuela de Madrid una mujer, Milagros Rivas Sáiz. [Lo volverá a ser en 2005 Ana Conthe Calvo].

(2010) Mar Domínguez Sierra y María González Corral son las primeras colegiadas en formar parte de la Junta Rectora de la Demarcación de Castilla y León.

(2011) El porcentaje de mujeres ingenieras de caminos sobre el total de colegiados es del 15,89%. [En la Demarcación de Castilla y León este porcentaje es del 16,19%].

Hasta marzo de 2011, de un total de 220 Medallas de Honor concedidas por el Colegio, sólo 1 se ha entregado a una colegiada (0,45%). En cuanto a las Medallas al Mérito Profesional, de un total de 249, han sido 2 las medallas concedidas a mujeres (0,80%).

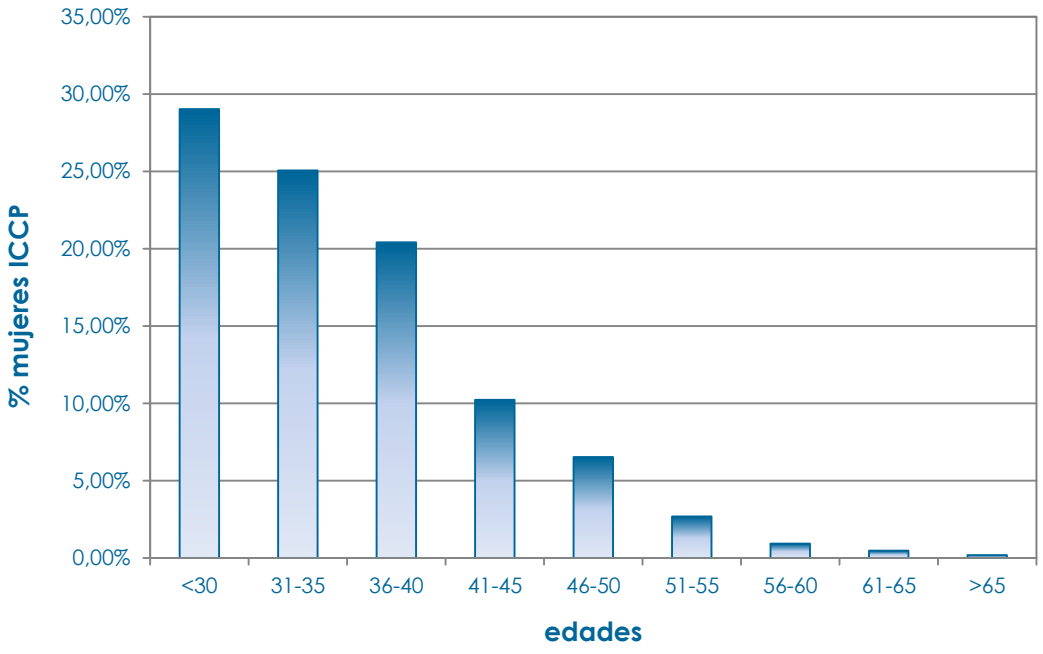
(2013) Una mujer, Montserrat Zamorano Toro, es nombrada Directora de la Escuela de Ingenieros de Caminos, Canales y Puertos de Granada.

(2016) Por primera vez en la Junta de Gobierno del Colegio de Ingenieros de Caminos, Canales y Puertos las mujeres son mayoría: 8 vocales sobre 10 (si bien el Presidente y Vicepresidente son hombres): María Pino Álvarez Sólvez, María del Camino Blázquez Blanco, Elisa Bueno Carrasco, Pilar Jaén Diego, Sara Perales Momparler, Fuencisla Sancho Gómez, Laura Tordera González, y Montserrat Zamorano Toro.

(2018) María González Corral se convierte en la primera Decana de la Junta Rectora de la Demarcación de Castilla y León.

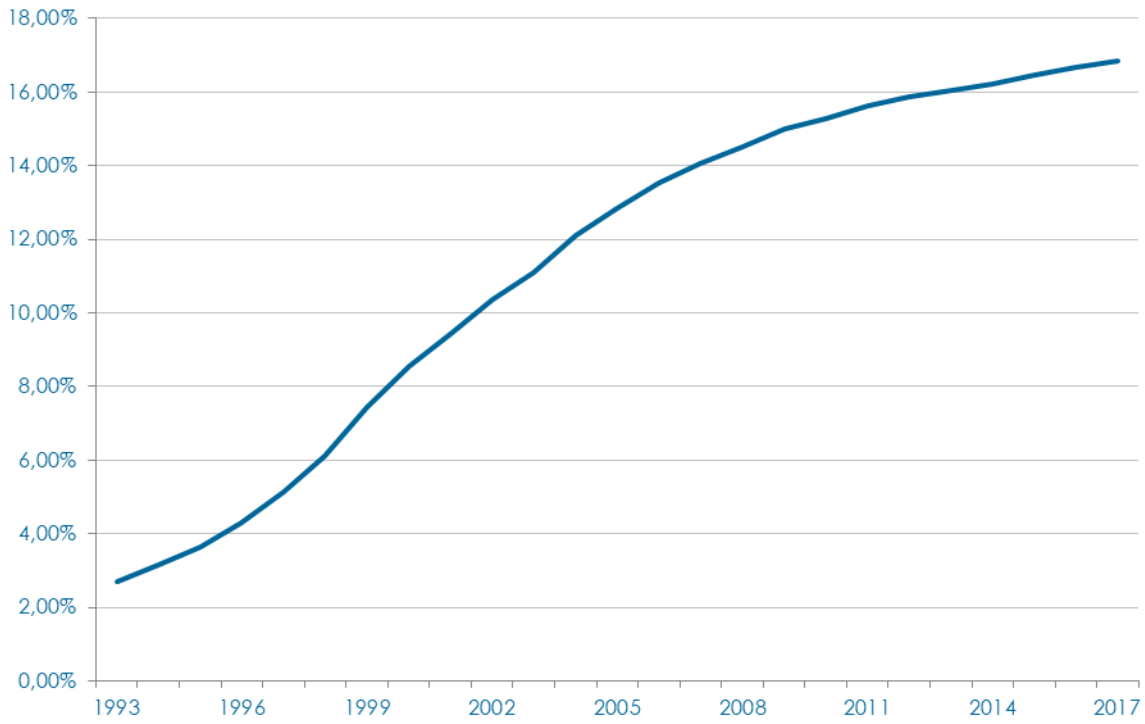
A continuación se adjuntan sendas tablas y gráficos –por categorías de edad y por años– con los porcentajes de mujeres ingenieras de caminos.

Colegiados por edades	% mujeres ICCP
Hasta 30 años	29,02%
Entre 31 y 35 años	25,06%
Entre 36 y 40 años	20,40%
Entre 41 y 45 años	10,23%
Entre 46 y 50 años	6,52%
Entre 51 y 55 años	2,68%
Entre 56 y 60 años	0,93%
Entre 61 y 65 años	0,46%
Más de 65 años	0,18%



Año	% mujeres ICCP
1993	2,71%
1994	3,16%
1995	3,65%
1996	4,30%
1997	5,15%

1998	6,12%
1999	7,43%
2000	8,56%
2001	9,44%
2002	10,36%
2003	11,11%
2004	12,09%
2005	12,85%
2006	13,54%
2007	14,05%
2008	14,53%
2009	14,99%
2010	15,27%
2011	15,63%
2012	15,86%
2013	16,05%
2014	16,22%
2015	16,45%
2016	16,68%
2017	**16,86%**



ALEMANIA

(1909) "Within the German Empire, state technical colleges [*Technische Hochschule*] allowed women to enter shortly after the universities had opened their doors to them. The Prussian state was one of the last to do so, in 1909". [Annette Vogt: "Women in Army Research: Ambivalent Careers in Nazi Germany"].

(1933) "While 18,316 women were studying at German universities toward the end or the Weimar Republic [1933], making up almost one-fifth of the entire student population, only 944 women registered with the technical colleges. Women were only five per cent of the student body there. After the National Socialists came to power, various demographic, economic, and political developments led to a dramatic drop in the general number of students, with the percentage of women falling at a higher rate than the average. This trend did not come to an end until the winter of 1937/38. From the beginning of World War II, both the universities and the technical colleges saw a rapid increase in their numbers of female students". [Karin Zachmann: "Mobilizing Womanpower: Women, Engineers and the East German State in the Cold War"].

(1965) "Women in Engineering [*Ausschuss Frauen im Ingenieurberuf* or FIB], it was founded in 1965 within the German Society of Engineers [*Verein deutocher Ingenieure* or VDI]". [Moniko Greif: "Women Engineers in Western Germany: Will We Ever Be Taken For Granted?"]

ESTADOS UNIDOS

(1883) "Emily Warren Roebling (1841-1902), who kept the family firm going when illness kept her husband housebound, acted as his proxy throughout most of the building of New York's Brooklyn Bridge in the 1870s and 1880s. Trained in mathematics, she learned to speak the language of engineers, made daily on-site inspections, dealt with contractors and materials suppliers, handled the technical correspondence, and negotiated the political frictions that inevitably arose in such a grand public project. The Brooklyn Bridge had been a Roebling project on which the family's fortunes depended, and Emily Roebling served as her husband's-proxy for decades". [Ruth Oldonziel: "Multiple-Entry Visas: Gender and Engineering in the US, 1870-1945"].

(1905) "The first such degree [civil engineering] to be awarded to a woman was granted by Cornell University to Nora Stanton Blatch in 1905". [En otra especialidad, *mechanical engineering*, se había graduado antes Catherine Anselm "Kate" Gleason, como escribe Richard G. Weingardt en *Engineering Legends. Great American Civil Engineers*: "She was the first female to enrol in Cornell University´s engineering program (1884) — although she was unable to complete her studies at Cornell, and she continued her studies upon returning to Rochester at the Mechanics Institute, later renamed Rochester Institute of

Technology —, plus the first woman to qualify as a member in these eminent organization: *Verein Deutscher Ingenieure*, the German Engineering Society (1914); Rochester Engineering Society (1917); American Society of Mechanical Engineers (1918); American Concrete Institute (1919)"].

(1916) "When Elmina Wilson and Nora Blatch applied for membership to the American Society of Civil Engineers, they found the doors closed. Having graduated *cum laude* in civil engineering from Cornell University, Nora Blatch could claim superior mathematical ability and theoretical engineering knowledge, the kind of credentials advocates of engineering schools thought crucial for any engineer to succeed. But Blatch had more to offer: she also possessed the necessary hands-on experience that advocates of shop floor and field training saw as hallmarks of the true engineer. In 1916, however, the society dropped her from its membership and Nora Stanton Blatch filed a lawsuit against the ASCE". [Ruth Oldonziel: "Multiple-Entry Visas: Gender and Engineering in the US, 1870-1945"].

(1927) "Elsie Eaves was the first woman in the US to be elected as a full member to the American Society of Civil Engineers (ASCE). When ASCE was founded in 1852, its membership was restricted to men, a policy which eventually led to a sexual discrimination lawsuit filed in 1916 by Nora Stanton Blatch DeForest, the granddaughter of women's rights advocate Elizabeth Cady Stanton. DeForest was an engineering graduate of Cornell University and was admitted to junior membership in ASCE in 1905. In 1915, when she no longer qualified as a junior member as she had surpassed the legal age limit per the ASCE bylaws, DeForest applied for associate membership. ASCE turned down her request for an associate membership and terminated her membership. DeForest filed a lawsuit. The case was tried in the New York Supreme Court, but the court ruled in favour of the Society, citing its status as a private organization. It would be another 11 years later, in 1927, when Elsie Eaves became the first woman to be admitted as a regular member of ASCE".

(2004) Dr. Patricia D. Galloway served as the first woman President of the American Society of Civil Engineers (ASCE).

(2018) For the first time in its 165-year history, ASCE boasts 3 women in its presidential leadership positions. Presidential Officer - Kristina L. Swallow.

FRANCIA

(1918) En 1829 se había fundado la *École centrale des arts et manufactures* con el objeto de impartir « un enseignement complet de sciences industrielles ». Women began to enter this school as early as 1918, while the first female state engineers were allowed to attend the *École polytechnique* as late as 1972". No obstante, "the decision to admit women to the *École centrale* in 1918 was preceded by heated debates. Advocates of women's right of admission invoked international examples, such as Hungary and Russia. In 1917

Bodin, a member of the *École centrale* Board of Directors mentioned that he visited an engineering women's school, in Saint Petersburg, in 1906. At the same meeting, Compere stressed that, during the Turin Exposition, Italy, he was struck to see a young Russian woman among the leaders in the electrical area. The idea that a woman could be educated in engineering proved difficult to accept. Advocates argued that the country had an economic stake in allowing women to enter into industry. The Russian example legitimized this as an objective for the school's presidents. In fact, in the years between the wars, nine percent of the women graduating from the *École centrale* — that is, five of fifty-five — were foreign students, including two from Russia and one from Italy. Women advocates also stressed that some women had developed a particular interest in science and engineering — rather than a masculine concern with professional careers — as a way to contain the threat of women's employment. The first female student graduated from the *École centrale* in 1921. Their number increased through the following years, but decreased in the period between the wars when the economy shrank considerably. In 1921, there were seven female graduates; in 1922 there were nine. From 1923 onwards, the number gradually decreased, to level off at an average of one to four women until the start of the Second World War". [Annie Canel: Maintaining the Walls : Women Engineers at the *École Polytechnique Féminine* and the *Grand Écoles* in France].

(1925) "A bright young female engineer named Marie-Louise Paris founded an engineering school for women, the Women´s Polytechnic School (*École Polytechnique Féminine*). Herself a graduate from the electro-technical institute in Grenoble, this ambitious woman was concerned with the need to provide women with formal scientific and technical training so that they could gain access to professional engineering. She also wanted to help them advance their careers. She achieved her ambition. In 1938, the Commission for the Title of Engineer included the Women´s Polytechnic School on the list of institutions that could grant the title of engineer to their graduates". [Annie Canel : Maintaining the Walls : Women Engineers at the *École Polytechnique Féminine* and the *Grand Écoles* in France].

(1959) "When the first female student of the *École des ponts et chaussées* arrived at the school doors on her very first day in 1959, she was received with flowers, and an article by two students about students' lives was accompanied by pictures of her. These pictures not only revealed the male students' perception of women — the pictures showed her, pretty and elegant, in a ball gown, at an official reception — they also underlined the fact that female students were expected to be Woman incarnate. The article in question did not say anything about the student herself, nor was she interviewed for the occasion. A woman who graduated a few years later comments: 'We were often invited by the older engineers who had graduated from the *École des ponts et chaussées*, they were willing to meet and support us, but we somehow felt that we were objects of curiosity'. […] This first woman to be admitted to the *École des ponts et chaussées* later remarked:

'I have never felt different nor alone; I never stood outside the school's mainstream.' Another woman, who graduated in 1969, similarly commented: 'We were fully integrated into our school environment; besides, we did not need to get together, we did not make up a separate group'. For such women, identification with feminism was unlikely". Por lo demás, "in the 1960s, the *École des ponts et chaussées* did not have more than one female graduate per year. However, from the early 1970s onwards, these numbers started to increase, and since the late 1980s, there have been twenty to thirty female graduates annually". [Annie Canel : Maintaining the Walls : Women Engineers at the *École Polytechnique Féminine* and the *Grand Écoles* in France].

(1972) En la *École polytechnique*, « les jeunes filles sont admises à concourir » : la primera *polytechnicienne* será Anne Chopinet, « qui devient ensuite ingénieur du corps des mines, destination traditionnelle des élèves les mieux classés à la sortie de l'École ».

(1975) "When the first women began to graduate from the *École polytechnique*, the Society of Mining and Civil Engineering gave a reception at which Françoise Giroud appeared as the guest of honour. In his welcoming address, the President of the engineering society expressed his concern with reference to women's 'natural' grace thus: 'We are currently worried about having female students around, for if, at this point in time, some 'technocrats' are capable of combining both charm and competence, God!, where will we be going next?"

(1992) « Il a fallu attendre 1992 en France pour qu'une femme, Claudine Hermann, soit nommée professeure à l'*École polytechnique*. »

(1994) En la École polytechnique "since 1994, at their request, women have worn the same hat as men. Recently, they asked for pants instead of skirts". [Annie Canel : Maintaining the Walls : Women Engineers at the École Polytechnique Féminine and the Grand Écoles in France].

(2011) El 17 de octubre LE MONDE publica un artículo, « Une école d'ingénieurs, avec ou sans prépa ? », en que se defiende que « contre les idées reçues, les grandes écoles d'ingénieurs sont loin d'être un univers masculin », pero la realidad es que sólo el « 27,4 % des ingénieurs sont des ingénieures. C'est peu, mais la progression ces quatre dernières années est de 12,6 % ».

GRAN BRETAÑA

(1919) "Early in 1919, a group of well-educated, ambitious British women, who had been recently engaged in munitions work, founded the Women's Engineering Society (WES), in order to protect themselves against risk of being forced out of the engineering business. Its founders immediately saw themselves confronted with the acute and abiding problem of their marginality". [Carroll Pursell: "Am I a Lady or an Engineer? The Origins of the Women´s Engineering Society in Britain, 1918-1940"].

(1927) Según Hugh Ferguson and Mike Chrimes (*The Civil Engineers. The Story of the Institution of Civil Engineers and the People Who Made it*), "it was not until 1927 that the Institution [of Civil Engineers] admitted its first female member. Dorothy 'Dot' Buchanan had worked with Ralph Freeman on design of Sydney Harbour Bridge, and with contractors S. Pearson & Sons and Dorman Long".

(1932) "Members of the King's College London Engineering Society heard rumours that women students in engineering might enter the College next autumn. This caused uproar amongst the gatherings in the Common Room; and it was decided to send a delegation from the Society to make representations to the Professional Board. A saying of 'the Little Professor' was quoted: 'there is no such thing as a woman engineer.' A petition against the entry of women students into the Engineering Faculty was signed by over 100 past students and by 110 present students. Result: No Women!". [Carroll Pursell: "Am I a Lady or an Engineer? The Origins of the Women´s Engineering Society in Britain, 1918-1940"].

(1933) "Shortly before World War I, a survey reported 12,271 'Engineers and Surveyors'' in the country, none of them women. It was the only profession, other than 'Barristers, Solicitors', to have no female participants at all. In 1933, Great Britain counted 46 women working in engineering". [Carroll Pursell: "Am I a Lady or an Engineer? The Origins of the Women´s Engineering Society in Britain, 1918-1940"].

(1957) "The first woman to transfer to the higher grade of 'member' [of Institution of Civil Engineers] was Mary Fergusson, in 1957, when there were only five female associate members and one graduate".

(1968) "Marie Lindley, who had a distinguished career as a water engineer in Uganda and Kenya before joining consultants Rofe & Raffety, was the first woman to become an ICE Council member in 1968".

ITALIA

(1908) "Il 5 settembre 1908 si laureava in Ingegneria Civile, al Politecnico di Torino, Emma Strada, la prima donna ad ottenere il titolo di Ingegnere nel nostro Paese. [...] Nel lontano ottobre 1903 una giovane e bella signorina si presentò al segretario del Politecnico di Torino e gli chiese di essere iscritta e frequentare i corsi di ingegneria. Il segretario, sorpreso e perplesso, andò a consultare il Regolamento e, non avendo trovato alcun articolo in contrario, accettò la prima iscrizione di una donna." (1) Il 5 settembre 1908 si laureava a pieni voti in ingegneria civile Emma Strada, la prima donna ad ottenere il titolo di ingegnere nel nostro Paese e in Europa. Fu assistente alla cattedra di Ingegneria Sanitaria dal 1908 al 1914 e, successivamente, come libera professionista, esercitò fino al 1940, eseguendo progetti di edifici, trascorrendo lunghi periodi in Calabria per sorvegliare la costruzione di linee ferroviarie, dedicandosi anche agli studi sulla fabbricazione del gas liquido". [Sandra Banfi: "L'ingegneria al femminile tra passato e futuro. Cento anni fa a Torino la laurea di Emma Strada"].

(1957) "Il 26 gennaio 1957 nasce AIDIA Associazione Italiana Donne Ingegneri e Architetti. Le socie fondatrici sono le ingegneri Emma Strada, Anna E. Armour, Ines Del Tetto Noto, Adele Racheli Domenighetti, Laura Lange, Alessandra Bonfanti Vietti e l'architetta Vittoria Ilardi. L'associazione ha come fine: –la promozione di scambi di idee a scopo culturale e professionale; –la valorizzazione del lavoro delle donne nel campo della tecnica; –l'assistenza reciproca nel campo della professione; –la crescita di legami culturali e professionali con analoghe associazioni italiane ed estere. Nel 1957 si tiene, a Venezia, il primo Convegno Nazionale intitolato "La donna nella professione dell'ingegneria e dell'architettura". Nel 1958 Emma Strada introduce,a Torino, il secondo convegno: "Affermazioni e possibilità delle donne nel campo della tecnica" durante il quale vengono sottolineate le carriere professionali di due socie fondatrici: Emma Strada e Adele Rachele Domenighetti; la prima aveva ottenuto grandi soddisfazioni in settori professionali tipicamente maschili delle miniere e delle ferrovie; la seconda aveva iniziato nel 1925, in un Ufficio Brevetti, come dipendente, diventandone poi la titolare".

(1997) "Maria Laura Luchi, prima ingegnere italiana Preside di una Facoltà di Ingegneria (1997-2008), Università della Calabria".

OTROS PAÍSES

AUSTRIA

(1919) "At the most important technical college in Vienna, the first open discussion on the subject occurred in 1910. The faculty considered a third petition from the Academic Women's Association [*Akademischer Frauenverein*]. The society demanded free admission of women to all kinds of advanced studies, including the technical disciplines, 'under the same conditions as men.' [...] In disccussing this petition, the faculty of the Vienna Technical College split into two factions of nearly equal size. One pleaded for a more or less unrestricted admission of women, while the other insisted on their further exclusion. These two factions remained remarkably consistent before 1918. [...] In June 1918, the conference of the heads of the Austrian technical colleges once again advised that women be admitted under the same conditions as men. After the dissolution of the Habsburg monarchy, the new state office for instruction [*Staatsamt fiir Unterricht*] of the young Austrian Republic made one more assessment of the views of the technical colleges, provincial governments and regional chambers of engineers. Then it declared (on 7 April 1919) that from the academic year 1919/20 women would be admitted as regular students to technical universities if they met the same standards as men, but on condition that the study of their male colleagues not be disturbed in any way. In explaining this decision and its timing, the decree stated that it was a 'trend of the time' that women, inevitably, would enter the higher technical professions. The decree also made reference to positive experiences with women in the war industry, and the right of women to equal opportunities for personal and occupational

development". [Juliane Mikoletzky: "Precarious Victories: The Entry of Women into Engineering Studies in Austria, 1900-1945"].

RUSIA

(1905) "On 22 August 1905, the society [Society for Providing Funding for Women´s Technical Education], headed by Nikolaj Belelubskij, was allowed to establish the Petersburg Polytechnic Courses for Women (PPCW). This institution opened its doors on 15 January the following year. The more neutral-sounding courses which were created instead of the suggested institute were cautiously pushed by the Ministry in order to avoid allusion to the higher scientific and technical school for men. The organizers had to accept this compromise in order to proceed, thus abandoning official recognition for their graduates as professionals. They accepted this, indeed, to gain time and to push ahead with their project whose major goal was clearly specified in the regulations: 'promoting higher technical education for women in those branches of technology where the use of female labour seemed to be the most suitable.' The founders were very ambitious. The new institution had four engineering departments: architecture, building engineering, electro mechanics and chemical engineering". [Dmitri Gouzévitch and Irina Gouzévitch: A Woman´s Challenge : The Petersburg Polytechnic Institute for Women, 1905-1918].

(1985) « Au milieu des années 1980, 58% des ingénieurs russes étaient des femmes ; avec la fin de l'URSS et la crise majeure traversée par son modèle industriel, la situation s'est inversée. On ne comptait plus que 43,3% d'ingénieures en 1998, 40,9% en 2002, et la courbe continue à baisser. »

SUECIA

(1921) "A young woman tried to enrol in the KTH [Royal Institute of Technology of Stockholm]. She was refused admission on the basis of the school's 1876 statutes, which stated that it was intended for 'young men who wish to pursue a technical occupation.' Several professors considered the statutes outmoded; women were, after all, allowed into the universities and higher schools of law and medicine. A committee was installed to determine whether women could be admitted into KTH as regular students. In its report, issued in 1893, the committee carne up with a negative answer, despite its acknowledging women's legitimate interest in studying technology. It also found, however, that the presence of women in the school would lead to important 'inconveniences', which was the reason why they should not be admitted. Consequently, women would have to wait till 1921 before they were allowed to pursue higher technical education on the same basis as men ». [Boel Berner: "Educating Men: Women and the Swedish Royal Institute of Technology, 1880-1930].