The Amalgamated Society of Engineers, Machinists, Smiths, Millwrights and Pattern Makers, which quickly became known as the Amalgamated Society of Engineers (ASE), was formed in 1851 from a number of sectional societies. Its founding general secretary, and one full-time official, was William Allan, who came from Carrickfergus, County Antrim. Members of older unions including the 'Old Mechanics' in Belfast, Cork, Drogheda, Dublin and Newry were among the first to join the 'new model' union. These Irish members numbered 411 in 1851, rising to 522 five years later, after the formation of branches in Dundalk, Kilkenny and Limerick. George Hodgins was secretary of the Dublin branch.

While engineering workers had been organised in Ireland before 1851 the development of a comprehensive railway network increased numbers significantly. As there was a shortage of skilled engineering labour in the areas where railway workshops were established, it was found necessary to import railway engineers from Britain. This led to the establishment of branches of the union in places such as Passage West, County Cork, Sligo and Stranorlar, County Donegal. With the development of the shipbuilding and engineering industries in the Belfast area there was a large growth in membership of the Belfast branch increasing from 460 members in 1862 to over 1,500 in 1891. The first union premises, in Ireland, were purchased in 1885 in College Street, Belfast.

Disputes in the 1890s, particularly in Limerick and Wexford, focused on wages, long hours (61 per week in the case of Wexford) and the introduction of unskilled labour. By the mid 1890s there were 15 branches in Ireland with a combined membership of almost 2,000 (the total membership of the ASE in 1894 was 71,221 in 512 branches). In 1892 it was decided to group local branches into districts. The district committees were given the right to pursue local policies on wages and conditions.

A close relationship developed between the Belfast and the Clyde districts. In 1895 a claim for a minimum rate of 7½d (c. 3p.) per hour was made by both districts. An agreement between the union's executive council and the employers failed to satisfy the Belfast men, who came out on strike. The employers reacted by laying-off men in both Belfast and on the Clyde; 3,000 ASE men and 1,500 non-union workers were caught up in what was described as "the strongest combination ever bound together to crush trade unionism." This was the newly formed Federation of Employers under the chairmanship of Colonel Reginald Dyer (who in 1919 was responsible for the Amritsar massacre in India). A new offer, made by the employers in January 1896, was accepted by the Clyde workers who returned to work. The executive council ordered the Belfast men to resume work, but they refused until forced to by a decision of the executive to withdraw benefits. These were subsequently restored due to strong objections from Belfast, which also resulted in the removal of the general secretary, John Anderson.

At the turn of the century, the Dublin district committee sought a basic rate of 34s (£1.70) per week. While they were ultimately successful, in so far as contract workers were concerned, a strike in 1902 of members in the railway workshops was unsuccessful. This dispute brought into prominence both William Partridge and Michael Lord, both of whom were elected Labour councillors to Dublin Corporation, and were active supporters of Connolly and Larkin. The Cork district was also quite active. There was one branch in the city and another in Passage West. A Queenstown (Cobh) branch was formed by Patrick O'Halloran who also played a central role in the foundation of the Queenstown Trades Council. The first full-time Irish official was appointed in 1913. While six candidates stood for election, the heavy concentration of members in Belfast secured the election of James Freeland, who established his office in that city.

The ASE was represented at the annual conference of the Irish Trade Union Congress for the first time in 1913. Its delegate was William Partridge who presided over the Dublin district committee's support for the ITGWU during the Lock-Out. Partridge was chosen by the DTC as one of its three delegates who attended the annual conference of the British TUC in September 1913, where he described the position in Dublin in that eventful year. During the period of the Lock-Out Partridge travelled throughout Britain addressing meetings and was responsible for much of the financial assistance that: was sent to Dublin.

During the period of the War of Independence pressure was put on the Irish membership to break from the ASE and establish an Irish-based union. A strategy of infiltration was embarked on to bring this about. In Cork at least one meeting was addressed by Terence McSwiney, while in Dublin Michael Collins was actively involved in the campaign. This strategy was successful in 1920 when a large portion of the members broke away and formed the Irish Engineering Industrial Union which soon suffered from Internal difficulties giving rise to a further split and the formation of the Irish General Railway and Foundry Union in 1922 and the Electrical Trades Union (Ireland) in 1923.

In 1915 the Belfast Hackle and Gill Makers Benevolent and Trade Union joined the ASE. This union
had been founded in 1863, registered as a trade union in 1880, and was a founder member of the Federation of Engineering and Shipbuilding Trades in 1891. In Britain amalgamation talks with other unions resulted in the formation of the Amalgamated Engineering Union (AEU) in 1920. One of these unions was the Amalgamated Association of Brassfounders, Turners, Fitters and Copper-smiths which had been established in 1912 by the amalgamation of a number of small sectional societies, which included the Belfast Brassfounders Association.

The AEU continued to organise in Ireland, though it was considerably weakened by splits. With the outbreak of World War 2 there was a considerable demand for engineering workers in Belfast and Britain and this, coupled with a decline in employment in the railway companies, encouraged a large movement of Irish engineering workers. At the end of the war these workers returned to Ireland carrying AEU cards. Membership in Ireland underwent expansion with the development of engineering activities in state sponsored bodies such as CIE, ESB, Aer Lingus, the Sugar Company and Bord na M6na. These developments in turn led to the appointment of the first full-time Dublin-based official in 1946 (Mike Waker).

Throughout the 1950s and 1960s the union sought to secure the establishment of a high basic rate for craft workers. This led to the establishment of the maintenance craftsmen's agreement in 1966, which for the first time established a national minimum rate for craftsmen in maintenance employment. A similar agreement was drawn up for contract shops. When a group of craft unions made a claim on the FUE, in 1968, for a review of the agreement and for an increase of more than £3 10s (£3.50) per week, the employers resisted. This led to the maintenance dispute of 1969, which lasted for nine weeks (and accounted for 629,000 lost working days) and almost brought industry to a standstill, and only was settled when the employers conceded the claim. For years afterwards the maintenance dispute was blamed for the high rise in inflation which followed. Even within the trade union movement it had repercussions and the ICTU, concerned about the number of people affected by the dispute, introduced the two-tier picketing policy.

The longest dispute (lasting 13 months) in which the union was involved in Ireland was in 1974, when a shop steward was dismissed by a Galway fork-lift company. It was brought to a head when, due to the continued refusal of the company to attend the Labour Court, the Dublin district council passed a resolution calling on all members in the Republic to stage a one-day strike in support of the Galway members'. This call received the approval of many workers and led to the intervention of the Minister for Labour who summoned the company to attend the Labour Court. The effect of the dispute helped to foster a close relationship between members of all trade unions in Galway at a time when industry was in decline in the city.

The AEU federated with the Amalgamated Union of Foundry Workers to form the Amalgamated Engineering Union and Foundry Workers in 1968. The Amalgamated Union of Foundry Workers had organised workers in Ireland and was affiliated to the ITUCI/ICTU from 1952. In 1970, the union federated with the Draughtsmen's and Allied Technicians Association (DATA) and the Constructional Engineering Union to form the Amalgamated Union of Engineering Workers (AUEW). The Constructional Engineering Union had organised a small number of workers in the Republic of Ireland in the 1920s and 1930s. In 1984 the foundry and construction sections of the union amalgamated with the engineering section and, two years later, the section catering for technical and supervisory workers (TASS) became an independent union. The union reverted to its earlier title AEU in the same year.